

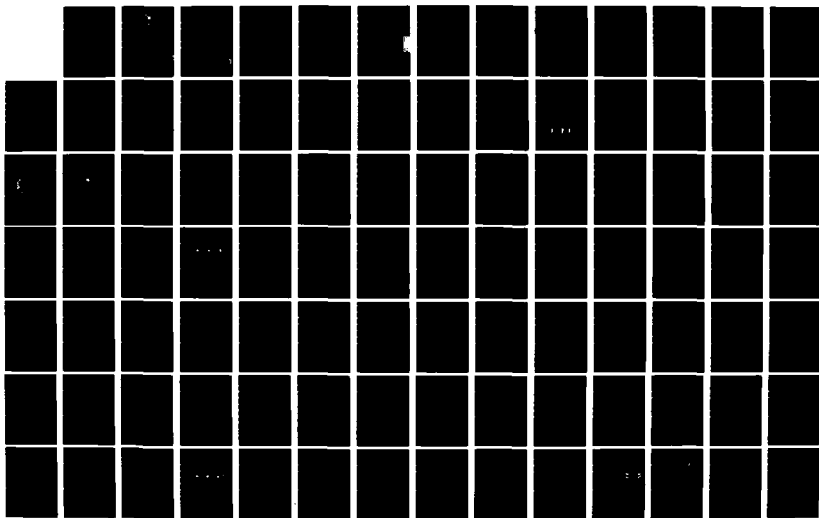
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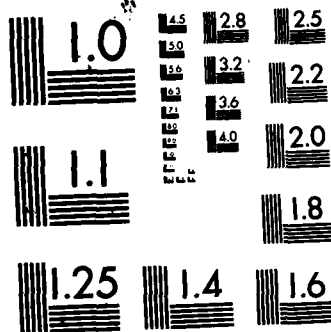
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Christopher D. Basham, 1st Lt, USAF

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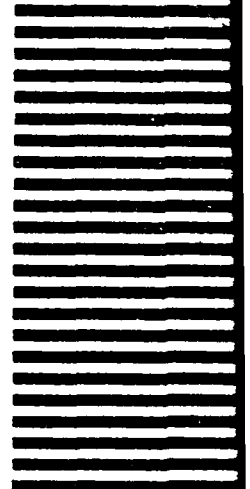
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The accessibility and communication of information used for the planning, programming, and design of Air Force facilities can determine the quality of early cost estimates, the efficiency of the design process, and the future operational effectiveness of a facility type. Since the 1950's, the Air Force has standardized facility information in an attempt to realize cost and time savings in the building delivery process. This thesis analyzes the past and present systems of packaging standardized information for facility types and proposes a new Facility Type Information Package (FTIP). The proposed FTIP should reduce the costs of obtaining facility type information, provide a more complete communication of information, improve the updating process, and will give directions for incorporating site specific information. General guidelines for the preparation of FTIP's and an example for a Child Care Center are also included.

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DEVELOPMENT OF FACILITY TYPE INFORMATION  
PACKAGES FOR DESIGN OF AIR FORCE FACILITIES

A Thesis

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Engineering Management

By

Christopher D. Basham, BA  
First Lieutenant, USAF

March 1983

Approved for public release;  
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This thesis, written by

First Lieutenant Christopher D. Basham

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

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Chris Basham



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## CHAPTER I

### STATEMENT OF THE PROBLEM

The accessibility, quality, and communicability of information used in planning, programming, and designing Air Force facilities can affect the quality of early cost estimates, the efficiency of the design process, and the future operational effectiveness of facilities.

The Air Force has standardized facility information since the 1950's in order to save cost and time in the building delivery process. Unfortunately, the current system sometimes does not work well. Ambiguous or contradictory regulations and the present method of packaging facility information can lead to misinterpretations, overbuilding, and lack of flexibility in design--all of which translate into cost and use inefficiency. Trial alternatives to the current system have met with only partial success, and the need still remains to find a more effective way to deliver facility information to the architects and engineers who must translate Air Force building needs into efficient and effective facilities.

The purpose of this thesis, stated in general terms, is to offer a better way to package facility design information. Later in this chapter, that general purpose is separated into specific objectives and research questions.

To help the reader evaluate both the specific objectives and the solution which is offered, the following section of background information will review current Air Force practice and the needs which the new procedure must fulfill.

## BACKGROUND

### Why Building Delivery Is Controlled

Appropriations for military construction in 1982 totaled 1.772 billion dollars. The proposed 1983 appropriations include 2.2 billion dollars for major construction and another 2 billion for minor construction (25; 12). This allocation of dollars to construction requires that careful attention be directed toward effective management and control of these construction dollars. The reasons for effective management control in this area are: (1) the relationship between facilities and mission accomplishment, (2) investment protection, (3) funding limitations, and (4) the changing environment.

### Mission Accomplishment

The relationship between facilities and an organization's ability to complete its mission is part of a larger model which includes time, activities, personnel, equipment, and funds as elements of mission accomplishment (10:13).

(See Figure 1.1.)



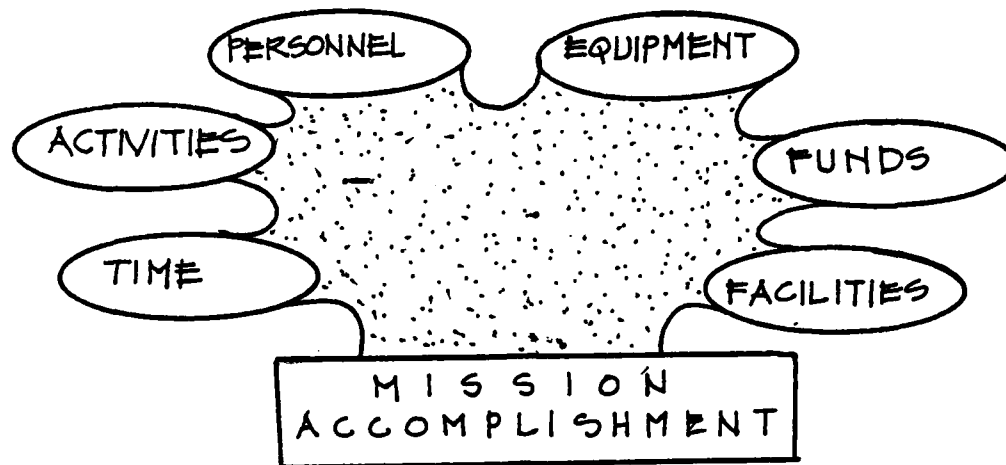


FIGURE 1.1: Mission Accomplishment Model

Facilities house personnel and equipment, consume time and funds to construct, and can either hinder or promote activities that occur within the facility or between facilities. Because of these relationships, the improper design, construction, operation, and/or maintenance of facilities can affect mission accomplishment.

#### Investment Protection

An investment of two billion dollars for the construction of facilities is intended to provide benefits for several decades. Decisions in the building delivery process which affect the life, maintainability, or utility of a facility include choices of materials and their placements. Siting, orientation, choice of functional relationships, and allowances for future expansion are early decisions which can affect the long term utility of a facility. Control of these types of decisions is vital to investment protection.

### Funding Limitations

Another reason for control in the building delivery process is the limited amount of funds appropriated to an area where demand exceeds available resources. With approximately 60% to 70% of submitted projects being approved for construction, there is indication of a need for both a prioritization of building needs and a "more with less" attitude (12). Direction is necessary to maximize the quantity, as well as quality, of facilities within the current funding limitations. Proper control can foster better management of both quantity and quality.

### Changes

A final reason for control in the building delivery process is the increasing frequency of changes which affect facilities--changes in people and their attitudes, changes in missions or operational procedures, and changes in the increasing amount of relevant design and construction information. The recent explosion of information on the physical, emotional, and sociological effects of buildings on people has caused a need for increased research to obtain relevant information for building design (59:28-35). Within the limited time available to most Air Force designers, an assessment of relevant information is seldom possible and thus, decisions are made with only partial information, a procedure that increases the chances of later problems. A

control system is necessary to monitor changes, weigh their impact, and act accordingly.

For the reasons of mission accomplishment, investment protection, funding limitations, and accommodation of changes, the Air Force has realized the need for control in the building delivery process. One area of the building delivery process for which control measures have been developed is the area of programming.

### Why Control Is Placed in the Programming Stage

#### Definition of Programming

Architectural programming is:

An organizing procedure for codifying and classifying numerous bits of project information. A program is a communicable statement of intent. It is a prescription for a desired set of events influenced by local constraints, and it states a set of desired conditions [43:4].

A process leading to the statement of an architectural problem and the requirements to be met in offering a solution--it is the search for sufficient information to clarify, to understand and to state the problem [36:5].

A process of identifying and defining the design needs of a facility and communicating the requirements of the client to the designer [35:7].

Architectural programming is concerned with the processes of information gathering, analysis, organization, and delivery (45:192; 36:22; 43:29). An architectural program is a careful professional assessment of an organization's real needs and goals, separated as much as

possible from wishes. An architectural program is usually started with a collection of general information common to a building type, followed by later additions of specific information for an individual building. Both elements are necessary for design decisions.

The program can be viewed as the problem definition and analysis stages of a decision model sequence (36:5; 45:150-163). Problem definition is the first step toward problem solution. Defining the need for and the needs of a particular facility is the first step toward the delivery of a suitable facility.

#### Why Programming?

Control can be accomplished through and with information. A building program is information. A building program is "one of the most important documents in the chain of the project delivery system [36:22]."

Programming as a stage in the building delivery process precedes the design of a facility. (See Figure 1.2.)

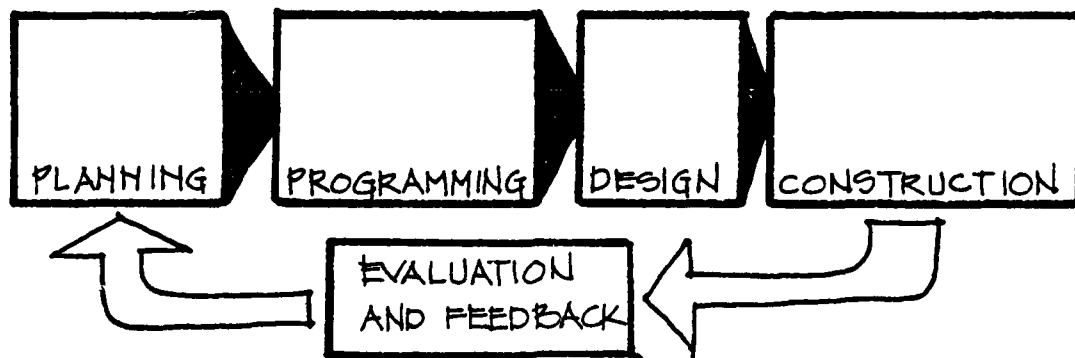


FIGURE 1.2: The Building Delivery Process

Because of the location of programming in the building delivery process, the results of programming will affect all later decisions. Mistakes made in programming, if they go undiscovered, are much more costly in time and dollars to correct than mistakes made at later stages (57:105). The cost of correcting a mistake caught during programming is, however, less than at any later stage (30:14). (See Figure 1.3.)

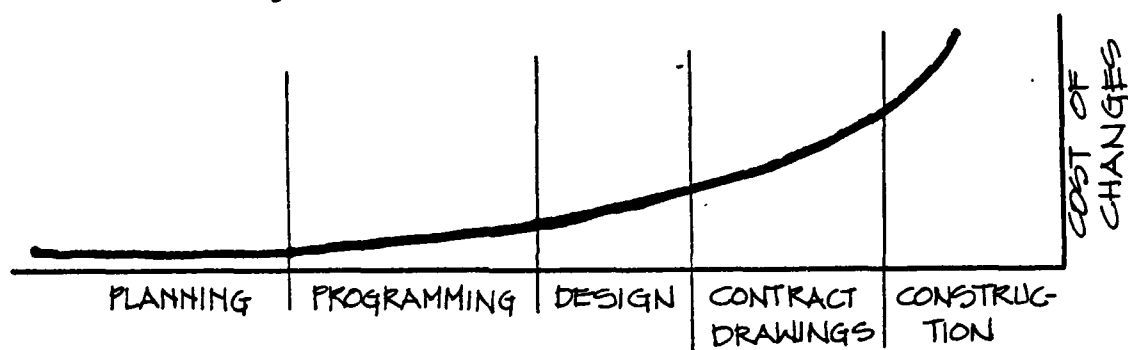


FIGURE 1.3: Building Changes and Costs

Another reason for control in programming is programming's relationship to design decisions. In design, decisions affecting material choices, costs, quality of construction, and functional layout are made. The decisions are made with information provided via the programming stage. If control of costs, quality, and layout is necessary, then there are two possible approaches to controlling the design decisions. One is to control the design process and the other is to control the input to design. The primary input to design is the programming information. (See Figure 1.4.)

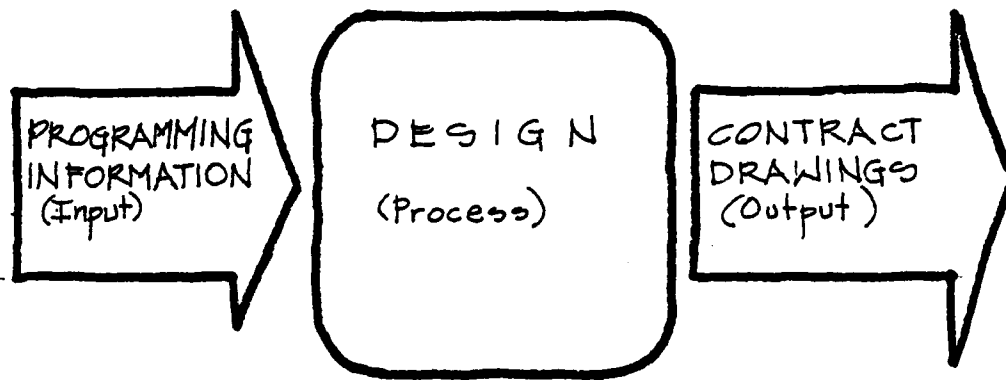


FIGURE 1.4: Programming Is Design Input.

Since the programming information is the primary source of input into design decisions, we can hypothesize that the quality of the programming information (input) has a direct impact on the quality of the designed product (output) (43:3-4).

Another reason for programming is for information storage and retrieval. The design of a facility requires a search for and collection of numerous bits of information. The size of the project influences the "in-head" capability of a designer to remember and organize the pertinent information (44). A programming document can aid in the organization and recording of information on projects, and it will also cover all pertinent aspects of a project. In view of the time constraints, possible information accessibility constraints, and the probable lack of experience of Air Force designers, a good program can virtually eliminate the possibility of omissions which can pose dangers to budgets and schedules (1:93-94).

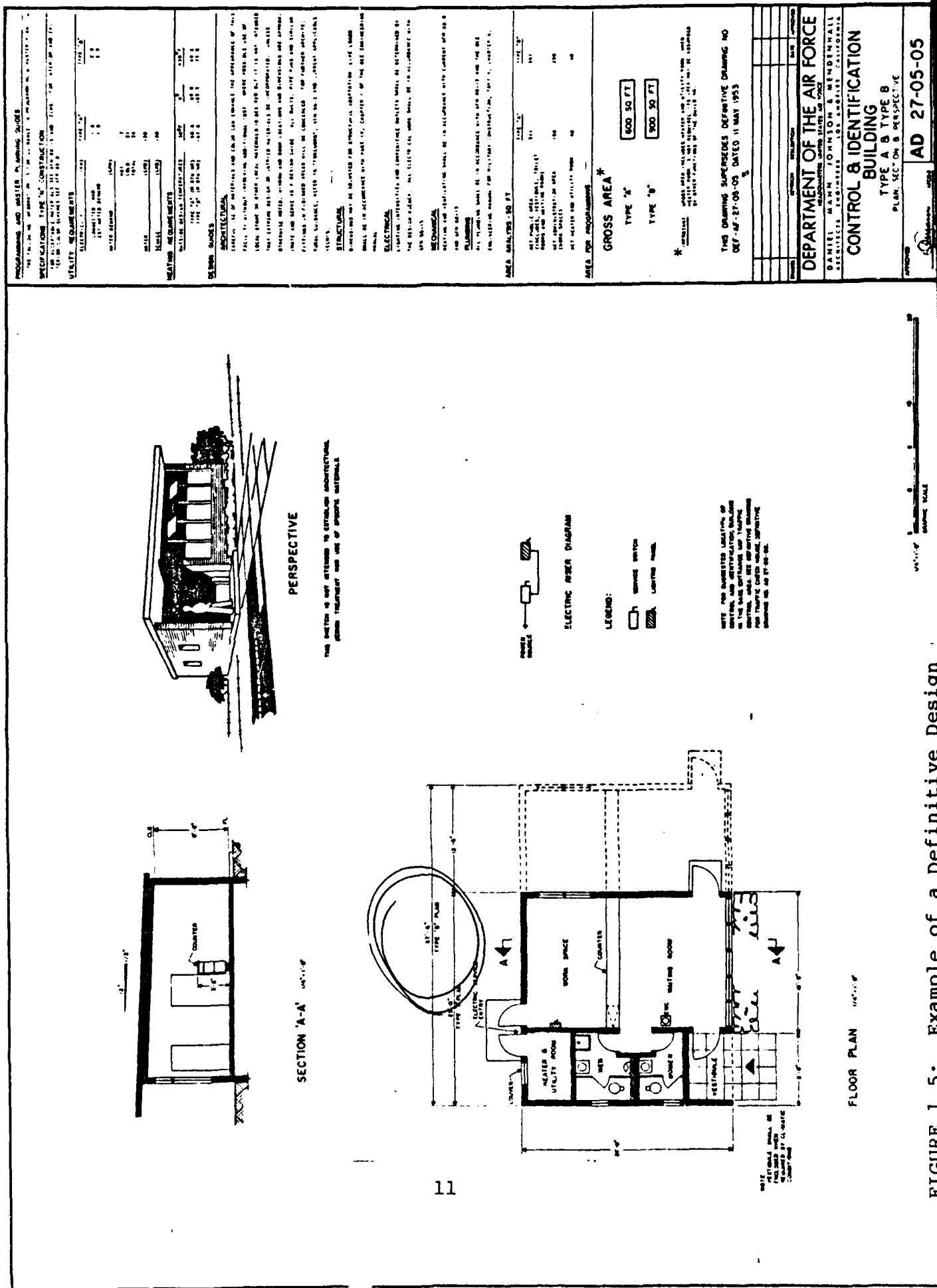
Cost control also begins with programming (36:77). The first area of cost that is better controlled due to programming is the cost of the design process. A good program leaves more time for design. Architects or other designers can avoid time wasted on irrelevant solutions which may consume time and even may result in a compromise in design dictated by time pressures (35:3). A 1967 study by Case and Company, management consultants, established the relationship of program quality to profitability. The study analyzed 1022 projects in which the client had provided the program. The company profits were 3.9% higher when the architect rated the program as "good" rather than "bad" (1:94). "Good" was defined as program completeness, clarity, and organization.

A building program incorporates many types of information, some of which is specific to a particular site and other information which can be classified as general construction information or as standard information for a particular facility type. The realization of these standard or general items and the subsequent incorporation into an easily accessible information package can further increase the benefits of a good program. The Air Force has wisely realized the potential benefits of packaged information on facility types but has encountered problems with the choices of package content and presentation.

## How the Air Force Controls Design Information

A major portion of the design information used by the Air Force is presented in the forms of regulations and manuals. Standardization of final product is a main emphasis throughout these documents. Standardization may be viewed as either positive or negative depending on its use. Positive aspects of standardization are guidance, standards for measurement, and usually cost savings. Negative aspects of standardization can be loss of flexibility, monotony and, if not periodically evaluated, cost increases. Standardization of the information used for design of Air Force facilities has, at times, included strict guidelines for procedures, material usage (54), facility requirements (51), and even for floor plans, window and door placement, and outside appearances of facilities (Definitive Designs of Air Force Structure, AFM 88-2 [52]). An example of a page from AFM 88-2, the Definitive Designs of Air Force Structure (52), is shown in Figure 1.5 and in Appendix A. The Definitive Designs are "hardline" drawings of floor plans. "Hardline" refers to the aspects of 90 degree corners, the placement of lines, and the showing of dimensions. The hardline representation signifies predetermined choices of structure, orientation, and layout that may not have been intended. The Definitive Designs have, in the past, been an input to the Air Force form of programming called a project book (PB). A completed project book





contains both standardized information and general and site specific information necessary for design of a facility (56). (See Figure 1.6.)

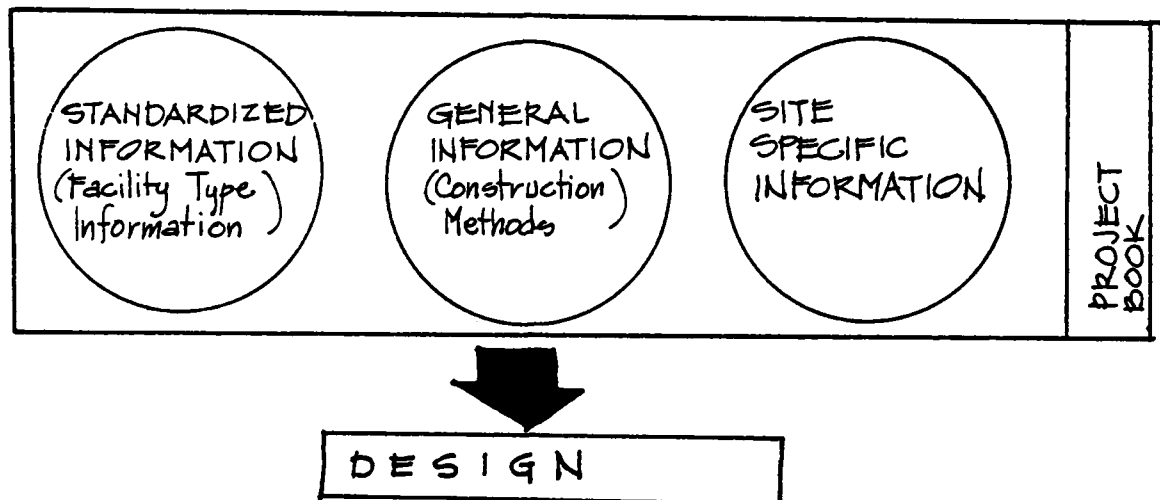


FIGURE 1.6: Type of Information in Project Books.

The presentation format of design information in the Definitive Designs has recently led to questions regarding the transmittal of necessary design information. Mr. Bill Brown, Chief of the Architecture and Engineering Branch, Engineering and Construction Division, Directorate of Engineering and Services, Department of the Air Force emphasized this concern in a recent letter (13). Mr. Brown wrote:

The Air Force is currently searching for a method to transmit design data previously conveyed through the Definitive Drawings (AFM 88-2). A better communicator of design data is required in order to alleviate general problems inherent in the current process and procedures. These include but are not limited to: a very high cost to develop, deliver and update AFM 88-2, and the perception by most designers that definitives must be followed completely without any deviation or alteration to accommodate site specific requirements [13].

The complete letter can be seen in Appendix B.

The questions regarding design information transmitted can be better analyzed by reviewing the history of the Definitive Designs, by analyzing their problems, and by analyzing the alternatives under consideration.

### History of Definitive Designs

Definitive Designs for Air Force Structures was developed by the Air Force using the Department of Defense manual 4270.1 (48). This document specifies facility requirements in written format only and was once applicable to all branches of service. The Air Force developed the definitized plans in the early 1950's in an attempt to produce cost savings in the building delivery process (11).

The latest development of Definitive Designs was the result of a 1955 study done for the Air Force by the architectural/engineering firm of Daniel, Mann, Johnson, and Mendenhall (DMJM) (19). The 1955 study noted several deficiencies with the Definitive Designs. Specifically cited were:

1. Definitive drawings did not show the specific requirements of those USAF agencies responsible for establishing specific facility requirements
2. The capability of facility expansion to meet mission changes had not been considered in the original planning
3. Information contained in the Definitive Designs was insufficient to provide the design agency responsible for development of working drawings with the design data necessary for the successful design of an adequate facility

4. In development of the Definitive Designs, the Engineering Division had been reliant upon existing Office of the Chief of Engineer's standards along with Navy Standards, some of which were not applicable to USAF requirements
5. The definitive designs provided insufficient information for programming and master planning agencies
6. Architectural guidance for the design agency was limited to plan, section, and elevation, which was inadequate to provide the USAF with well-planned, well-designed and optimum operational buildings.

The recommendations of the DMJM study led to the latest development of the Definitive Designs manual (11). The specific improvement of the current over the original definitives are:

The positive identification of a requirement for a facility type and an identification of the repetitive programming aspect before a facility is included into the Definitive Designs [19:7]

The inclusion of additional information such as utility requirements, net area analysis, a description of the capability or function of the facility [somewhat limited], gross square foot area, notes on where to find other architectural, structural, mechanical, and electrical information relevant to building, and a list of equipment necessary and authorized for the particular facility [19:11-12].

The Definitive Design manual, AFM 88-2, was distributed to all major commands and all base Civil Engineering organizations and has been used for several years. Presently the Definitive Design manual is out of print and is no longer available for distribution because of some inherent problems.

## Problems with Definitive Designs

The problems that have arisen with the definitive design system of information transmission are misinterpretation, overbuilding, loss of flexibility, poor communication ability, costs, and the lack of an effective updating and evaluation process. These will each be discussed separately.

### 1. Misinterpretation.

The first problem is the degree of standardization meant to be portrayed by AFM 88-2. Paragraph 3 of the introduction to the Definitive Designs manual (52) states "Variations will be the exception [italics supplied] and will be limited to modifications that can be justified on an architectural, engineering, or economic basis," yet no criteria for justification is presented. Several other regulations and manuals also refer to the use of AFM 88-2, the Definitive Designs.

AFR 89-1, Facility Construction--Design and Construction Management, paragraph 2-7 states:

Definitive drawings are not intended to dictate architectural treatment of the use of specific materials or structural systems. The designer should be permitted sufficient latitude to create a credible design that uses suitable up-to-date materials and construction techniques, while maintaining the functional characteristics of the definitive design arrangement [all italics supplied].

Yet paragraph 2-8(c) of the same regulation states:

Basic criteria and outline specifications for the Air Force facility design and construction, 88 series manuals and pamphlets . . . must be followed without deviation [italics supplied] in preparing contract drawings and specifications [52].

AFM 88-15, Facility Design and Construction (54), in paragraph 1-5 (a) (3) states "AFM 88-2 [52] establishes architectural requirements, space allowances, and arrangements [all italics supplied]" and paragraph 1-6 says:

the architectural design must (1) reflect careful consideration of the type and arrangement of fenestration and entrances, and (2) provide high quality architectural layout and treatment through the expert use of economical basic design concepts [52].

It appears from the previous quotes that the degree of standardization or flexibility intended is not well portrayed. This ambiguity exists not only in the regulations and manuals but also among respective users.

A survey (47) of air staff and command level personnel attending a course at the Air Force Institute of Technology (AFIT) and 40 base level engineers attending a contingency engineering course at the same site showed the effects of this ambiguity. In the first group of command level personnel, the response to a question concerning the perceived flexibility of Definitive Designs yielded the responses summarized below:

--No one thought Definitives should be followed exactly

--35% thought Definitives were to be used as a standard with only minimum variation allowed

--61% thought Definitives were to be used as a guide for design with variation encouraged

--and 14% thought Definitives were to be used as a guide with variation not only encouraged but mandated.

The second group of base level engineers responded as follows:

--No one thought Definitives should be followed directly

--22% thought Definitives were to be used as a standard with only minimum variation allowed

--64% thought Definitives were to be used as a guide with variation encouraged

--and 14% thought Definitives were to be used as a guide with variation not only encouraged but mandated.

It can be seen that none of the respondents in either group thought definitives were to be followed exactly, but one-third thought variation was the exception.

The uncertainty about the intended degree of standardization and flexibility is also apparent in the minds of some commercial architects who have designed Air Force buildings and were provided the Definitive Designs as an input (44, 58, 28, 11, 39). Even though designer flexibility was verbally stressed during the contracts, the floor plan of the Definitives Designs, coupled with the perception of military standardization and rigidity, hindered the architect's perceived freedom in design choices. The results were thus only "vanilla" solutions and the Air Force

received only drafting services rather than the design services intended (58).

The ambiguity of flexibility in the use of the Definitive Designs was probably initiated by the inconsistency of direction given in the regulations and manuals and by hardline presentation of supposedly flexible design information used in the Definitive Designs manual. Recommendations to provide consistency and continuity of the intended designer flexibility are included in the recommendation section of this thesis.

## 2. Overbuilding.

The ambiguity and potential for misinterpretation has in some cases led to overbuilding. Overbuilding is the construction of a facility that exceeds the requirements and may thus mean wasted time, effort, money, and space. A major variability not accounted for by the Definitive Designs is differences in scope that may change from project to project. Although some definitives may have as many as 18 different sizes, the average number is less than three, and half of the definitives have only one size plan. (See Appendices A and C.) A coinciding fault is that the size standards of the Definitive Designs are typically based on troop strength rather than actual demand factors affecting space needs (15:30-31).



### 3. Loss of Flexibility.

The choice of hardline floor plans to relate design information has implied a certain rigidity not intended.

According to Heismeth (27:111):

Definitive plans are the equivalent to definitive specifications; in both cases the architect is told what to do in specific terms. That such heavy handed accountability has led to thoughtless, inflexible, and needlessly repetitive design is apparent to design professionals and government alike.

Standards are usually meant to portray minimum acceptable end products but as one author puts it, "Too often standards, even when set as a minimum, become maximum [37:40]."

The elements which are standardized in the Definitive Designs are such things as floor plans, areas, and equipment lists. These are elements which are design solutions rather than design objectives or goals. These single solutions imply optimality "for use on a worldwide basis [AFM 88-2, paragraph 2]." Optimum solutions in architecture are impossibilities. Architecture is successful conflict resolution (43:1,97; 57:107; 38:88). The amount of conflicting information that is an input to design would allow only suboptimization at best. Inputs to the design process vary with location and time. To imply even a single universal suboptimized solution is erroneous and would represent a lack of flexibility to provide a more economical site specific solution. For example, the optimum size and loca-

tion of windows for the incorporation of a passive solar heating system varies with location, time of day, and day of the year. The ability to provide a single optimum solution for "worldwide use" is an impossibility.

#### 4. Communications Ability.

In order to measure and evaluate communicative ability of a document, the intended purpose, the choice of presentation format, and the user's perceived purpose of the document must be known. The intended purpose of the Definitive Designs, as noted previously, has not been well defined. One of the reasons lies in the choice of presentation format. The choice of presentation in the Definitives was primarily the hardline floor plans. These hardline floor plans, complete with dimensions, indicate single solutions, but the apparent intent of the drafters of AFM 88-2 was more flexibility in design.

The choice for the name of AFM 88-2, Definitive Designs for Air Force Structures, also miscommunicates the intended flexibility. A definitive is meant to define. To define is to set boundaries and mark limits as what is included and what is not. A good definition will set limits that preclude anything but the object being defined to fit into the boundaries. As used, the term "definitive designs" implies very strict limits.

Communications ability also considers the users of the information. As was stated by the DMJM study, there was

an insufficient communication of information to programmers and master planners.

#### 5. Costs.

There are three areas of cost concerns in relation to the use of Definitive Designs. The first of these is publication costs. At present the AF Definitive Designs manual is the most expensive publication in the Air Force inventory (11). This expense is due to the cost of development and the cost of printing the oversized (10" X 15 1/4") pages necessary to present the information in its current format. The development of the Definitive Designs was the culmination of extensive research done for a facility or building type by an outside commercial architectural/engineering firm (there is not documentation or sufficient evidence of the research effort). The amount of work done to develop the supposedly optimum building floor plan and information is a more expansive effort and has a broader potential impact than what accompanies normal design activities of the firm. The 1982 cost of development of a single sheet in the Definitive Designs manual was \$6000.00 (11, 12, 13). If this is multiplied by the 400 pages of the document, the expense is evident.

Another aspect of publication costs is the printing costs. The cost of printing 10" X 15 1/4" sheets is approximately \$45.00/1000 as compared to \$20.00/1000 sheets for 8 1/2" X 11" manuals (1). If the information could be

formatted to a standard 8 1/2" X 11" sheet, savings could be realized.

A second area of the total cost is distribution cost. Because of the large size of the sheets, the cost to distribute the Definitives Design manual is correspondingly high. At present the Definitive Designs manual contains all the facility types that have been definitized, and this package is sent to all bases. It is possible that not all bases have a need for information on all facility types.

The third area of cost concern has to do with benefit/cost analysis. The Definitive Designs, with the definitive drawings, were developed and implemented on the premise that such standardization would reduce costs--costs of design and cost of construction (15, 19, 52). There seems to be no record of a cost/benefit analysis to support this premise. Definitive drawings reduce design costs only if the definitive drawings are used with little or no changes. Definitive drawings are given to Architectural-Engineer (AE) firms to provide design information to the AE. If this information saves time in the research effort of an AE who is designing an Air Force facility, then there should be a difference between the price of the services of AE's who use a definitive drawing in the development and those who do not. Another concern that should be considered in a cost/benefit analysis is the long range impact of

definitized drawings in terms of land use, the environment, energy, and life cycle costs (15).

#### 6. Updating and Evaluation.

Inherent in standardized programming and design criteria is the danger that they become cemented for too long without adjustments and necessary changes [37].

The current process for updating the Definitive Designs involves the production of a replacement page. This new page incurs a cost similar to the production of the original (11). This high cost can cause an extension between updates to allow more changes to be incorporated in a single update. The extension of such updates permits recognized faults in a Definitive Designs to be used for a longer period. Evaluation of the Definitive Designs should also periodically review the contents of the document. Some of the Definitive Designs are 15 years old and are no longer even used by the Air Force (12). The evaluation of Definitive Designs is encouraged, a fact stated in the introduction to the manual, but evaluation is required.

The Definitive Designs manual was developed in order to produce cost and time savings in the building delivery process. The motive for the manual is commendable but the implementation has yielded problems of misinterpretation, overbuilding, in lack of intended flexibility, in communicative ability, and problems related to costs.

## Alternatives Under Consideration

In an attempt to resolve some of the deficiencies noted in the Definitive Design program, the Air Force has considered two alternate systems to the Definitive Designs. These are bubble diagrams and design guides. These are not without certain deficiencies.

### Bubble Diagrams

Bubble diagrams are graphical displays of space interrelationships and adjacencies. (See Figure 1.7 and Appendix D.)

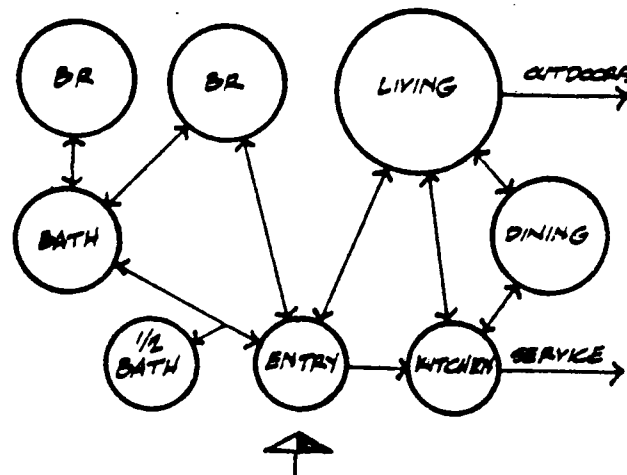


FIGURE 1.7: Example of a Bubble Diagram

The sizing of the bubbles in a bubble diagram usually does not relate to the required area for a particular space. The "links" or lines connecting the bubbles can graphically show the intensity or frequency of a relationship by either varying the width of the connecting line or by varying the number of lines connecting the bubbles.

Bubble diagrams have been used for some time by most architects to transform written design information into more easily used graphical information. Bubble diagrams were under consideration as replacements for the hardline floor plans in the Definitive Designs manual (11, 12).

The advantage of using bubble diagrams was increased design flexibility in floor plans to accommodate site specific considerations such as the landscape, the climate, energy related design factors, and unique user requirements. The "softness" of the rounded edges of bubble diagrams helped convey the Air Force allowance of design flexibility without sacrificing the information on desired functional relationships.

When the bubble diagrams were distributed and used on an experimental basis, some of the problems associated with the Definitive Designs were still present and a new one arose. There was still a lack of needed information. The bubble diagrams clarified functional relationships but did not add any additional information.

The new problem stemming from the use of the bubble diagrams was one of communication. A previous use of the Definitive Designs had been to "sell" a facility to wing and base commanders (47, 11, 12). The hardline floor plan of definitive drawings greatly aided the comprehension of the commander about the "look" of the facility he would be getting. The use of bubble diagrams for the same purpose

was not as well understood by the commanders. From these incidents it became apparent that the design information must be communicated to other users as well as the architect. Other users included such personnel as planners, programmers, and facility users. To counter the lack of information and communicability of bubble diagrams, the Air Force is currently investigating the use of design guides.

### Design Guides

The U. S. Corps of Engineers developed a design guide approach in the 1970's to achieve both accountability and adaptability to local conditions (21). It was also intended to avoid the overbuilding caused through the use of definitives (15:26-27). The design guide approach was developed to produce more responsive architecture and to cost less than the previous system (27:111).

Design guides are written packages of design information which spell out design objectives, environmental and energy concerns, functional requirements, and equipment suggestions. The design guides under consideration by the Air Force are a package of 20 to 50 (8 1/2" X 11") written sheets of design information. (See Example in Appendix E.) Some graphic representations are used in the form of figures, graphs, and tables. The increase in design information afforded by the design guides is a substantial improvement over the definitive drawings and the bubble diagrams.



The communicative ability of the design guides is yet untested in the field. Speculation yields two potential problems, one with the use of mainly written instructions and the other with length. Written instructions in the Air Force seem to be the standard, but written instructions of design information may not be the best approach. The old saying may apply--"A picture is worth a thousand words."

The other potential problem is length. Twenty to fifty pages of information requires an extensive effort to organize and retain, for design inclusion, all elements and their relationships. The ability to quickly find specifically wanted information is not aided by the length of the design guides.

#### SUMMARY OF BACKGROUND

The Air Force controls the facilities because of the potential effects on mission accomplishment, the need to protect the substantial investments in facilities, the scarcity of funds matched with an abundance of need, and lastly, because there is a need to monitor and adapt, if necessary, to a constantly changing environment. A major portion of the control effort occurs in the predesign stages known as programming. Here, control is through and with the information provided. The value of a good building program has been tested, and the results are time control, quality control, information control, and cost control.

The Air Force has controlled building type information through the initial use of DOD manual 4270.1, through the use of AFM 88-2: Definitive Designs for Air Force Structures and bubble diagrams to the present design guides under development. (See Figure 1.8.)

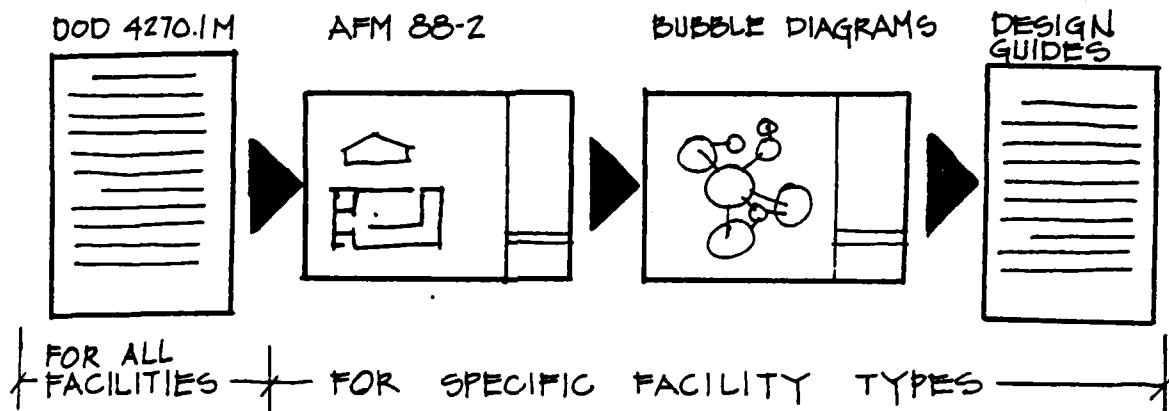


FIGURE 1.8: Evolution of Air Force Design Information

Each successive step has solved some of the deficiencies of its predecessor but has created its own problems. To solve the Air Force's need for comprehensive and comprehensible packaging of standardized facility type information packages is the overall objective of this thesis.

#### RESEARCH OBJECTIVES

As stated earlier in this chapter, the objective of this research is to develop a facility type information package which is an improvement over the past systems. In order to accomplish such a task, several subobjectives are considered. They are to

1. Identify the users and uses of facility type information

2. Identify the characteristics of an optimum system for transmitting facility type information
3. Develop general guidelines from the optimum characteristics for the future development of facility type information packages
4. Develop a specific facility type information package for a Child Care Center so that it may be compared with previous methods for transmitting facility type information.

#### RESEARCH QUESTIONS

In order to meet the stated objectives, the following questions must be answered:

1. What are the various uses of facility type information?
2. Who are the users of facility type information?
3. What are the characteristics of an optimum control system for transmitting facility type information?
4. What would a specific example look like?
5. How does the proposed method compare with the previous methods of transmitting facility type information?
6. Given the characteristics of an optimum system and an example of the proposed new package, what would be the appropriate general guidelines for transmitting facility type information?

## CHAPTER II

### METHODOLOGY

#### Overview

The first step of this research effort was identification and validation of the stated problem. The problem was initially identified in a telephone conversation with Mr. William A. Brown, Sr., in January of 1982. Mr. Brown is the Chief of the Architecture and Engineering Branch, Engineering and Construction Division, Directorate of Engineering and Services, Department of the Air Force. The problems of transmitting design information and the history of the Air Force search for an appropriate package were discussed. Mr. Brown's views about the problem were later outlined in a letter from his office (See Appendix B). Mr. Brown's perception that a problem did exist was confirmed by a survey distributed among a convenience sample of 68 Air Force Civil Engineering officers attending various courses at the Air Force Institute of Technology (See Appendix F).

Validation of the problem's presence and scope was followed by the formulation of research questions. The remainder of this chapter will review the chosen methodologies. A division is made according to each of the research questions stated at the end of Chapter I. The corresponding

limitations and assumptions of each of the methods used are discussed in the final section of this chapter.

Research Question One. What are the various uses of facility type information?

The approach for this question was threefold. The resources used were an extensive literature review, questions in the survey that was distributed, and interviews with developers and known users of facility type information. The literature review consisted of: (1) Air Force regulations and manuals, cited throughout this report, pertaining to the use of facility type information, (2) books and periodicals which contain information about the uses of facility type information, (3) Army regulations pertaining to the use of facility type information, and (4) research reports from the Army's Construction Engineering Research Laboratory in Champaign, Illinois.

The second approach was a survey distributed to 28 Command and Air Staff level Air Force Civil Engineering personnel and 40 base level Civil Engineering personnel, all attending short term courses at the Air Force Institute of Technology. The survey contained questions relating to the uses of Definitive Designs for Air Force Structures (AFM 88-2), which was the past Air Force method of transmitting facility type information. These questions were analyzed to identify the frequency of use for various known uses of facility type information.

The final method used to answer research question one was to conduct both personal and telephone interviews with experts in the field who (1) have been responsible for and involved in the development of facility type information for the Air Force, (2) have used the Definitive Designs manual in developing construction documents for the Air Force, or (3) have developed their own facility type information guides for commercial use. The interviewees were:

1. Mr William Brown, Sr.  
Chief, Architecture and Engineering Branch  
Engineering and Construction Division  
Directorate of Engineering and Services  
Department of the Air Force
2. Mr. David Dressel  
Architect, Facilities System Division  
Army Civil Engineering Research Laboratory  
Champaign, Illinois
3. Mr James Enloe  
Architect, Architecture and Engineering Branch  
Engineering and Construction Division  
Directorate of Engineering and Services
4. Professor Yuji Kishimoto  
Department of Architectural Studies  
College of Architecture  
Clemson University, Clemson, VA
5. Mr. James Slager  
Architect, HQ AFLC  
Wright-Patterson AFB, OH
6. Mr. Gayland Weatherspoon  
Department Head, Department of Architectural Studies  
College of Architecture  
Clemson University, Clemson, VA
7. Mr. William L. Pulgram  
Associated Space Design  
Atlanta, Georgia

The results of the threefold approach for research question one are reported in Chapter III and have been incorporated into both the general guidelines for the development of facility type information packages (Chapter V) and into the Child Care Center example (Chapter IV).

Research Question Two. Who are the users of facility type information?

Identification of the users of facility type information was derived through the various uses of the information. User characteristics were identified using the same threefold approach explained in the methodology for research question one.

Research Question Three. What are the characteristics of an optimum control system for transmitting facility type information?

The search for characteristics was divided into five major areas--content, communicability, accessibility, evaluation and update, and costs. The methods used in the research were an extensive literature review, telephone and personal interviews, a survey, and an examination of other methods of transmitting building type information. The matrix of Table 2.1 displays the methods used for each area.

The literature review consisted of Army regulations, Air Force regulations and manuals, periodicals, books and research reports from the Army's Construction Engineering Research Laboratory. The interviewees were the same as in research questions one and two. The last approach, an

examination of other existing methods of transmitting

Table 2.1

Methods Used For Characteristics Identification

	C O N T E N T S	C O M M U N I C A B I L I T Y	A C C E S S I B I L I T Y	E V A L U A T I O N / U P D A T E	C O S T S
Literature Review	0	0	0	0	0
Interviews	0	0	0	0	0
Survey	0	0	0		
Examination of Other Methods	0	0		0	

facility type information, consisted of an examination of the following methods:

1. The prototype Air Force design guides (Appendix E)
2. The Army's design guides
3. The Definitive Designs manual (AFM 88-2) (52)
4. Bubble diagrams (Appendix D)
5. Time Saver Standards for Building Types (18)



6. Guidelines for the Planning and Design of Regional and Community Correction Centers for Adults (32)
7. Patterns for Designing Childrens' Centers (34)

The methodologies were used to compile information about each of the five characteristics areas. Content characteristics are based on the frequency of use in other methods of transmitting facility type information and an understanding of the uses of building type information. The communicability characteristics are based on perceived need (survey and interviews), research results (literature review), and current usage (examination of other systems). Accessibility characteristics are based on locations and frequency of use. Evaluation and updating characteristics are based on the need for updating and the processes used in the examined methods of transmitting facility type information. Cost characteristics are based on costs for existing methods and the costs of components of a facility type information package such as development, printing, and distribution.

Research Question Four. What would a specific example look like?

The specific example of the proposed package is an individual development by the author which incorporates the information obtained in answering the previous research questions. The specific example is evaluated in terms of the characteristics identified in Chapter III.

Research Question Five. How does the proposed method compare with the previous methods of transmitting facility type information?

The proposed package is compared with other Air Force methods of transmitting facility type information based on the degree that each method approaches the characteristics identified in Chapter III.

Research Question Six. Given the characteristics of an optimum system and an example of the proposed new package, what would be the appropriate general guidelines for developing and transmitting facility type information?

As a result of the previous research questions, characteristics of an optimum package for transmitting facility-type information have been identified, a new author-developed package has been designed and compared with previous packages, and that package is proposed for implementation. This effort has led to the identification of some general guidelines to be used in development and transmittal of facility type information. The guidelines are based on the characteristics identified in Chapter III and the interrelationships of these characteristics that were identified by the author in the development of the proposed package.

Summary of Methodology. Table 2.2 summarizes the methodologies used to answer each of the research questions.

## Limitations and Assumptions

Each methodology will be reviewed separately.

1. Literature review. The limitations of the literature review were only in the area of programming. Information is relatively new in this area, and thus published

Table 2.2

## Methodologies for Answering Research Questions

	R E S E A R C H  Q U E S T I O N  O N E	R E S E A R C H  Q U E S T I O N  T W O	RESEARCH QUESTION THREE					R E S E A R C H  Q U E S T I O N  F O U R	R E S E A R C H  Q U E S T I O N  F I V E	R E S E A R C H  Q U E S T I O N  S I X
			C O N T E N T S	C O M M U N I C A B I L I T Y	A C C E S S I B I L I T Y	E V A L U A T I O N / U P D A T E	C O S T S			
Literature Review	0	0	0	0	0	0	0			
Survey	0	0	0	0	0	0				
Interviews	0	0	0	0	0	0	0			
Examination of Other Methods			0	0		0				
Author Generated								0	0	0

works are scarce. One assumption is that information on communication in general and communication of facility type

information for commercial use is applicable to communication of facility type information for the Air Force. It is also assumed that the literature represents a more generalizable information source than does the collection of opinions from the interviews and survey. A final assumption is that specific information deemed applicable by the Army for its own use is applicable for Air Force counterparts.

2. Survey. The survey was distributed to a convenience sample and the statistically generalizable information it provided is limited. Its role in the research was to help the author establish the nature of the problem and the needs of intended users of facility type information. Its information has not been applied beyond these uses.

3. Interviews. The interviews were also conducted with a convenience sample, thus also limiting the statistical generalizability of the information obtained. However, since all interviewees are experts in their fields, they supplied information that is essential to the study. The interviews were unstructured to permit respondents to more creatively express ideas on transmitting facility type information rather than a structured interview that would be used to obtain a general consensus of established ideas.

4. Examination of other methods. A limitation of this approach is that all methods of compiling facility type information are not accessible. Methods other than those examined may have been developed for personal or corporate

use and are not accessible to the general public. Another assumption is that individual elements of the methods examined that were not identified somewhere as being inadequate, are adequate for the respective users.

## CHAPTER III

### IDENTIFICATION OF CHARACTERISTICS

#### Overview

The purpose of this chapter is to report the characteristics of an optimum system to transmit facility type information. These identified characteristics were used to develop and evaluate the proposed package to transmit facility type information developed by the author and presented in Chapter IV. The identification of characteristics is in response to research questions one, two, and three. The identification was accomplished from information obtained through: (1) the literature review, (2) the survey, (3) the interviews, (4) the criteria used to judge past Air Force methods of transmitting facility type information, and (5) the frequency of inclusion in other packages of design information.

The characteristics have been divided into seven areas. The areas are: (1) use identification, (2) user identification, (3) content requirements, (4) communication requirements, (5) accessibility requirements, (6) evaluation and updating requirements, and (7) cost information. The final section of this chapter will summarize the characteristics that were identified. These criteria became the

criteria for development and evaluation of the proposed package to transmit facility type information.

### Use Identification

The primary use of a system which transmits facility type information is informational. A review of the literature and of the survey and interviews conducted revealed four uses of facility type information packages and building programs. These four uses are informational, promotional, evaluatory, and educational. These categorizations of use are defined and are then followed by an examination of their use in the building delivery process.

#### Informational

Informational use is defined as the use of a package to provide specific information--for example, to relay the storage requirement for a particular area in a facility. Several sources identified this particular usage (11; 18:xv; 44; 57:56; 59:71, 13-16; 52). Information may be provided to form a basis for quality control, standardization, and cost control of constructed facilities (10:11).

Design information can be communicated as guidelines or as specific criteria depending on its intended use (52; 33; 32; 34). An example of guideline information might be for the designer to be aware of child scale when designing a child care center. An example of specific criteria information might be to tell the designer to put six wall

sockets at 54 inches above the floor out of the reach of the children in Room "A." The degree of information detail or flexibility is dependent upon the user requirements.

### Promotional

The promotional use is defined as the aspect of using the packaged information to "sell" someone on the virtues of a particular facility. The survey conducted for this paper showed that 36.8 percent of the respondents had formerly used the drawings in the Definitive Designs manual to "sell" a facility to another individual (47). A major deficiency noted in the use of bubble diagrams is their failure as "a vehicle for selling nontechnical personnel on the need for a facility [13]." Specifically, "it is very difficult to brief a wing commander on a facility when graphically all that can be shown to this individual is a series of circles (bubbles) [12]." White (59:13-16) also discusses the importance of a promotional package.

### Evaluatory

The evaluatory use of a facility type information package is defined as the use of a package to measure an existing situation against criteria provided in the package. For example, if the package stated the facility should be based on 60 square feet per person, then the adequacy of an existing facility could be determined. This evaluative aspect can be at various stages in the building delivery



process (59:13-16; 45:158-163). "Evaluation requires that there be a desired goal or standard and a commitment to judge against that standard [59:81]."

### Educational

The educational use of a facility type information package is defined as its use to familiarize users with a particular facility type. The educational use differs from the informational use in that it is concerned with only general information such as purpose of the facility, its function, its organization, and its major components. This educational aspect can serve both the client and the designer. The package can serve as a framework for the designer to understand the client operations and as a tool to educate the client on the design process (59:13-16).

### Location of Use

The four uses of facility type information--informational, promotional, evaluatory, and educational--occur at various stages during the building delivery process. The building delivery process essentially consists of eight steps--evaluation, planning, programming, design, construction, operation, maintenance, and reevaluation.

(See Figure 3.1.)

Each step in the delivery process will be examined for the potential uses of facility type information. The uses are identified in the parentheses.

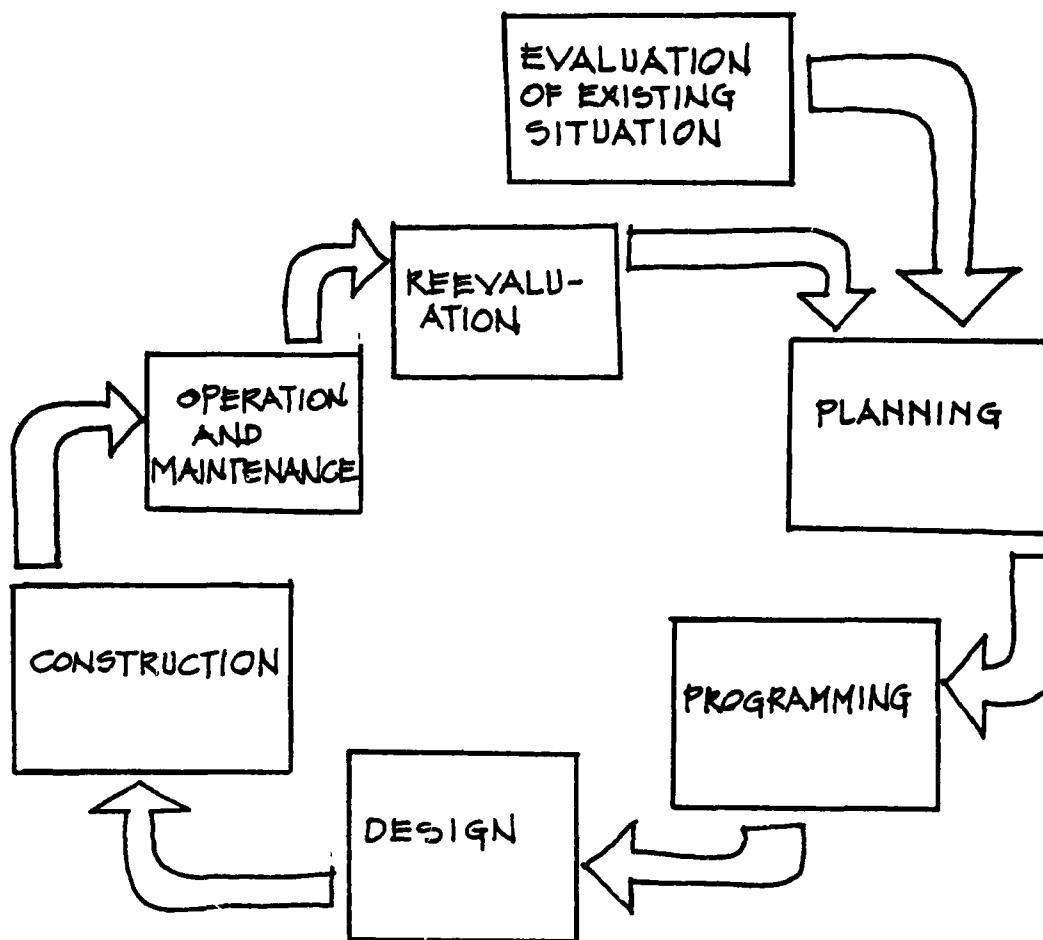


FIGURE 3.1: The Cycle of Building Delivery

1. Evaluation of Existing Situation.

A facility type information package could serve to educate both the facility user and an inspector on the purpose (educational) and standards (evaluatory) for a particular facility type.

2. Planning.

Facility planners need to know both the deficiencies of the existing situation (evaluatory) and the standards and

requirements for a new facility (educational and informational).

### 3. Programming.

Facility programming involves a setting of priorities as to what is to get built. This prioritization involves the selling of one facility over another facility or project (promotional). If successfully included in the programming list, information which will direct the allocation of resource is necessary (educational and informational). This information is provided via DOD Form 1391's and/or Project Books, which will be discussed later.

### 4. Design.

Both general and specific information (educational and informational) is needed to successfully design a facility. Choosing among design options may involve measurement against standards (evaluatory), and the selling of a potential solution to a client (promotional).

### 5. Construction.

During and upon completion of construction, a facility is evaluated in terms of conformance to construction drawings and to local codes and regulations. If the local codes and regulations were identified in the building program, the package can aid evaluation (evaluatory).

## 6. Operation.

A facility is designed to function a certain way. Familiarizing the user of these aspects (educational) is necessary for the successful operation of a facility to its maximum potential.

## 7. Maintenance.

Choices of materials and their placement can affect the maintenance characteristics of a facility. If material choice and placement are identified in the initial program, then a set of maintenance instructions could also be provided (educational).

## 8. Reevaluation.

Reevaluation of a facility usually occurs when major deficiencies are noted. If periodic evaluation occurs, then smaller deficiencies are more likely to be recognized (evaluatory). Repetitive deficiencies should be recorded and accounted for in the updated facility type information package.

The matrix in Table 3.1 summarizes the potential uses of facility type information during the building delivery process.

The criteria to be used from this section to develop and evaluate the proposed package to transmit facility type information are:

1. Is the package usable as an information resource?

Table 3.1

Use of Facility Type Information During the Building  
Delivery Process

	Inform	Promote	Evaluate	Educate
Evaluation			0	0
Planning	0		0	0
Programming	0	0		0
Design	0	0	0	0
Construction			0	
O & M				0
Reevaluation			0	0

2. Can it be used as a promotional package?
3. Does it aid in evaluation of facilities during predesign, design, and postdesign?
4. Does it serve effectively as an educational tool?

Abbreviated for later use, these functions are identified as:

1. informational
2. promotional
3. evaluatory
4. educational

User Identification

The identification of the users and their needs is a primary step in the design of any management control system (2:78). The use of facility type information packages is a form of management control. The previous identification of the uses of facility type information and the location of those uses define the potential users of the information. The users can be categorized as technically oriented or nontechnically oriented and as Air Force personnel or non-Air Force personnel (11; 21; 44; 47).

The technically oriented personnel are individuals familiar with the process of facility design and construction. They may be Air Force personnel or non-Air Force personnel. The Air Force personnel who are technically oriented include the planners, programmers, designers, and inspectors of Air Force facilities. Non-Air Force personnel could consist of commercial planners, designers, and builders.

Nontechnically oriented users of facility type information may not be familiar with the building delivery process or the common terminology used by the technical users. The nontechnically oriented personnel may be Air Force or non-Air Force.

A distinction is made between Air Force and non-Air Force because there may be peculiarities of the Air Force criteria which could affect building design which a non-Air Force user would not automatically be aware of. The accuracy, level of detail, and transmittal of facility type information is dependent upon the respective user background and needs. Requirements for content and communication of information are presented in following sections.

Considering the diversity of potential uses and users of facility type information, there are two possible approaches to information delivery. The first approach is to provide all potential users with all the information that will be needed by any one user in a form understandable

to the nontechnical personnel. The second approach is to apportion information on an as-needed basis for each respective user. A choice between these two alternatives will be presented later in this chapter after other factors which can influence this decision have been considered.

The criteria to be used to develop and evaluate the proposed package to transmit facility type information are:

1. Is it oriented for both technical and nontechnical personnel?
2. Is it oriented for both Air Force and non-Air Force personnel?
3. Is it oriented for use by programmers and designers?

Abbreviated for future use, these are:

1. nontechnical and technical orientation
2. usable by non-Air Force and Air Force users
3. usable format for programming
4. usable format for design

#### Content Requirements

Consultants flourish in the design fields because there is no body of information assembled in such a way that it is useful to architects and other design professionals. Hence the tremendous importance of library consultants, church consultants, hospital consultants . . . [46:6].

Consolidation of specialized and general information for facility types is a much needed tool (46:6-10; 2; 37:45). The development of packages of information on building or facility types can provide the needed tool for design.

A primary factor to be considered in the development of facility type information packages is what types of information should be included. Indeed, an even more fundamental question that must be answered is which facility types can economically justify the development of information packages. The manual of Definitive Design for Air Force Structures was based on repetitively programmed facilities (19; 15:26-28) yet no mention is made as to how many of a certain type facility constitute "repetitively programmed." Chapter IV, the proposed package and its evaluation, contains the author's suggested guidelines for this determination.

Another element of this broader point is a question regarding the level of detail and flexibility to be presented in a package (25). Past methods of transmitting facility type information have assumed that the same level of detail and flexibility was necessary for all the facility types. It is possible that some facilities may be more effectively definitized rather than allowed to have design flexibility. For example, a munitions storage facility might be sufficiently designed from a definitive drawing rather than a more extensive document such as a design guide. No criteria for this type of decision was found in the literature. Mr. Bill Brown has suggested that the differentiating element is people--the degree a facility should be oriented to user satisfaction (11). Author generated guidelines for this decision are provided in Chapter IV.



Given the criteria to choose the types of facilities and the level of detail and flexibility to provide, the next concern is the specific contents of a package. The research effort was directed toward the contents of a facility program. A building program consists of both general and site specific information. A facility program for the Air Force consists of four groupings of information. These are:

1. Information general to all Air Force construction such as recommended usages of materials, fire codes, and electrical codes (Air Force general construction information)
2. Information general to a specific base such as criteria for local climate or geography and guidelines for conformance to regional architectural style or a base master color plan (base specific information)
3. Information specific to a building type, i.e. say a bowling alley, and generalizable for that facility type on all Air Force bases (building type information)
4. Information specific to a particular site only such as gradation of the soil on the site, existing landscape and streets, size of the site, and other characteristics peculiar to the single site (site specific information).

Most packages of facility type information contain only building type information. Previous Air Force packages of facility type information have included more than just building type information. The Air Force packages have also attempted to include information general to Air Force construction and a statement to support the inclusion of both base specific and site specific information. This direction was followed in the development of the proposed facility type information package.

The types of facts and degree of detail that will be required will depend upon the purpose of the document, the degree of complexity of the client's operations, the performance standards required of the facility, and the number of special or unusual conditions involved with a particular facility (59:53). The concept of standardizing either the types of facts or degree of detail for facility type information packages must consider the above listed variables.

An examination of the literature on facility programs shows somewhat of a consensus on content requirements but a divergence in terminology. Table 3.2 lists several authors' suggestions for content of facility programs. Examination of the suggested contents of Table 3.2 and a knowledge of the Air Force building delivery process led to a decision to identify content requirements by point of use in the building delivery process.

#### Content Requirements and the Building Delivery Process

##### 1. Evaluation of Existing Situation.

The type of information needed for evaluation is criteria statements which are related to facility requirements and are standards for measurement. The criteria could be a checklist of requirements concerned with measuring the adequacy of space, functional layout, and performance requirements for building components.

Evaluative use of facility type information packages has not been emphasized in previous Air Force packages, but they have functioned in this respect. In predesign, a facility type information package can provide criteria to aid in the evaluation of the need for facility expansion, a new facility, or no change. In design, the package can act as a premise for design and as criteria for evaluation of the design solution (36:80). In post design, the package can be used to gauge how well a facility performs its intended functions and meets other stated design criteria.

One purpose of a facility type information package is to prevent and correct recurrence of problems and to predict the spatial and environmental needs of a project (29:229). This prevention and correction involves a process of problem identification, analysis, and package updating.

Lack of formal evaluation is seen as a major block to the development of anything like a science of design. Evaluations presently are made independent of the design process and its assumptions about the uses of the building [29:316].

Inadequate feedback is a shortcoming of the current design process (22:118; 24). Feedback from maintenance records and records of renovations should be examined for ideas to be incorporated into updated information packages.

Facility evaluation is the process of discovering how well a facility works either in terms of its original program or in terms important to the users when the

Table 3.2

## Suggested Contents for Facility Programs

	Agostini (1)	Bennet (8)	Durken (23)	Palmer (35)	Pena (36)
F U N C T I O N A L	⊕ Operational efficiency	● Performance requirements	● Structure, power, and social status ● Physical proximities ⊕ Functional requests ⊕ Permeability and interference ⊕ Identification of conflicts	⊕ Client objectives ⊕ Client philosophies/history ⊕ Client organization ● Facility type ● Codes, standards, etc. ● Function, operations ⊕ Site conditions	Function ⊕ People ⊕ Activities ⊕ Relationships
H U M A N	⊕ Human amenities	⊕ Safety/health information ⊕ Comfort requirements	● Health/safety ⊕ Comfort ⊕ Privacy	⊕ User need issues ⊕ Existing problems ⊕ Demographic	
C H A N G E	⊕ Orderly growth		⊕ Flexibility	⊕ Growth projections	Time ⊕ Past ⊕ Present ⊕ Future
P O R M		⊕ Aesthetical Considerations	⊕ Imagery/aesthetics	⊕ Design issues ⊕ Project constraints	Form ⊕ Site ⊕ Environment ⊕ Quality
C O S T S					Economy ⊕ Initial budget ⊕ Operating costs ⊕ Life cycle costs

⊕=Site specific  
⊕=Combination  
●=General information

Table 3.2 (continued)

	Robbie (42)	Snyder (45)	Wade (57)	White (59)
P U N C T I O N A L	<ul style="list-style-type: none"> <li>● Use</li> <li>● Functions and areas</li> <li>● Interactions</li> <li>● Critical Dimensions</li> <li>● Standards</li> <li>● Environment</li> <li>● Building security</li> <li>● Site layout</li> <li>● Local construction techniques</li> <li>● Contract conditions</li> <li>● Characteristics of staffing operation and management</li> </ul>	<ul style="list-style-type: none"> <li>● Size</li> <li>● Site</li> <li>● Siting</li> <li>● Interaction</li> <li>● Integration</li> <li>● Important issues</li> </ul>	<ul style="list-style-type: none"> <li>Demand <ul style="list-style-type: none"> <li>● Client requirements</li> <li>● Regulations</li> <li>● (Negotiability?)</li> </ul> </li> <li>Supplies <ul style="list-style-type: none"> <li>● Existing conditions</li> <li>● Client resources</li> <li>● (Manipulability?)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Goals <ul style="list-style-type: none"> <li>● Purpose of project</li> <li>● Client and user goals</li> <li>● Project description</li> </ul> </li> <li>Facts <ul style="list-style-type: none"> <li>● Quantitative</li> <li>● Qualitative</li> <li>● Information and issues</li> </ul> </li> </ul>
H U M A N				
C H A N G E				<ul style="list-style-type: none"> <li>● Precepts (commitments, assumptions, direction)</li> </ul>
F O R M		<ul style="list-style-type: none"> <li>● Images</li> </ul>		<ul style="list-style-type: none"> <li>● Concepts (direction)</li> </ul>
C O S T S	<ul style="list-style-type: none"> <li>● Favored construction quality</li> <li>● Budget cost</li> </ul>			

●=Site specific

●=Combination

●=General information

evaluation occurs or in terms interesting to architectural researchers (23:10). Buildings are evaluated for the same important reasons that products are--to prevent failure (which in buildings can result in accidents, disfunction, misfit), to provide good value to its users, and to provide accountability for those responsible for its construction (45:412).

Evaluation requires a criterion to measure against (29:318; 9:11-14). These criterion should be used throughout the building delivery process. Use of the criteria in evaluation of an existing facility may lead to a realization of facility deficiencies and thus, possibly, a decision to construct a new facility. The same criteria should also be used in the design process to ensure the incorporation of important criteria. Finally, the criteria should be used to evaluate a facility at various points during the life of the facility.

The literature suggests several areas for evaluation. These are the technical, functional, and behavioral aspects (45:414). Technical evaluation is the most common type of evaluation (45:414-419). It includes evaluation of a facility's compliance with fire codes, building codes, methods of construction, illumination, acoustics, and HVAC. These are relatively easy to evaluate because the criteria are singularly factual or quantitative and tests reveal either compliance or noncompliance. Functional and behavioral evaluation are not as common or not as easy.

Criteria for functional or behavioral evaluation cannot always be as factual or quantitative as criteria for technical evaluation. Functional evaluation is concerned with human factors, locational grouping, circulation, storage, and flexibility and change. If criteria are developed for functional evaluation, then ranges of values of the criteria may be more beneficial and accurate. For example, storage requirements might be stated as so many linear feet of storage per person or as a range, say, 10-15 linear feet of storage per office, thus allowing for personal or site specific information to influence the decision.

Behavioral evaluation is yet an untested concept. Behavioral criteria could be in the area of building use, proximity and territory requirements, and privacy versus interaction requirements (45:414). Behavioral science is a relatively new field. The incorporation of behavioral requirements and criteria into design information is still under research. It is suggested that a first step would be to distinguish and record the designer's assumptions about occupant behavior (45:47).

The designer has certain theories as to why the existing environment isn't working. He may also have ideas as to how he might make some improvements . . . ideas which are eventually incorporated into a new space. This usually marks the completion of the transaction between the client and designer. It is suggested, however, that designer's ideas are really hypotheses

. . . testable hypotheses . . . about man-environment interactions [37:43].

The second step in behavioral evaluation of a facility would be to record and analyze users' opinions of a facility. Identification and analysis of the components of user satisfaction could lead to a priority listing of user wants (37:41). Any attempt to incorporate behavioral criteria into facility type information packages would be a step in this new direction.

## 2. Planning.

The planning of an Air Force facility involves initial decisions of purpose, function, general siting and rough estimates of costs. Information which would help the planning process would be a statement of the purpose and the function of a particular facility type, general guidelines for siting such a facility, and guidelines for calculating a rough idea of costs based on, for example, a unit of measure which is correlated to scope, such as a cost per number of students for an educational facility.

## 3. Programming.

The programming of Air Force facilities is accomplished via a Department of Defense form 1391, and via Project Books. Directions for programming a facility via the 1391 are given in AFR 86-1, Programming Civil Engineer Resources (55). The programming effort involves



completion of the 1391 and possibly a 1391C which requires a single line drawing of the floor plan and siting of the requested facility. An examination of the information requested on the 1391 (See Figure 3.2) yields the following type of information that can be drawn from a facility type information package:

Table 3.3

Facility Type Information and the DOD Form 1391

Section A	1.	Category code number . . . . .	(item 7)
	2.	Type of construction . . . . .	(item 14)
	3.	Type of design . . . . .	(item 17)
	4.	Physical Characteristics of facility . . . . .	(item 18-partial)
	5.	Description of work to be done . .	(item 19)
Section B	6.	Cost estimates	(item 20-rough estimate)
Section C	7.	Requirement for a project (Could potentially help answer the three questions of Project, Requirement, and Current Situation)	(item 25)

If a project is to be sent to Congress for approval, a project book (PB) is developed which is essentially a complete facility program of design information. Extensive time and effort is expended in the development of project books. The PB serves as a reference during review of the DD Form 1391 as it provides valuable supplemental information to serve as backup material for Congressional hearings during which questions must be answered quickly and

1. DATE		2. FISCAL YEAR		MILITARY CONSTRUCTION PROJECT DATA				3. DEPARTMENT		4. INSTALLATION		5. HOST COMMAND SYMBOL	
6. PRIOR AUTHORIZATION		7. CATEGORY CODE NUMBER		8. PROGRAM ELEMENT NUMBER		9. STATE/COUNTRY		10. PROJECT TITLE		11. BUDGET ACCOUNT NUMBER		12. PROJECT NUMBER	
13. PROPOSED APPROPRIATION		14. P.L.		15. BUDGET ACCOUNT NUMBER		16. PROJECT NUMBER		17. PROJECT TITLE		18. PROJECT NUMBER		19. PROJECT TITLE	
<div style="display: flex; justify-content: space-between;"> <div> <p><b>SECTION A - DESCRIPTION OF PROJECT</b></p> <p>1. TYPE OF CONSTRUCTION</p> <p>2. PERMANENT</p> <p>3. SEMI-PERMANENT</p> <p>4. TEMPORARY</p> <p>5. TYPE OF WORK</p> <p>6. NEW FACILITY</p> <p>7. ADDITION</p> <p>8. ALTERATION</p> <p>9. CONVERSION</p> <p>10. OTHER (SPECIFY)</p> <p>11. REPLACEMENT</p> <p>12. TYPE OF DESIGN</p> <p>13. STANDARD DESIGN</p> <p>14. SPECIAL DESIGN</p> <p>15. DRAWING NO.</p> </div> <div> <p><b>PHYSICAL CHARACTERISTICS OF PRIMARY FACILITY</b></p> <p>16. NO. OF BLOBS</p> <p>17. NO. OF STORIES</p> <p>18. LENGTH</p> <p>19. WIDTH</p> <p>20. GROSS AREA</p> <p>21. COST (\$)</p> <p>22. CAP</p> <p>23. DESCRIPTION OF WORK TO BE DONE</p> <p><b>GENERAL</b></p> <p>MAKE INFO READABLE TO NON-TECHNICAL INDIVIDUAL. DO NOT USE ABBREVIATIONS, BLOGS, ETC. IF YOU REQUIRE X DOLLARS, THEN BLOCK AS SHOULD SUPPORT THAT COST</p> </div> </div>													
<div style="display: flex; justify-content: space-between;"> <div> <p><b>SECTION B - COST ESTIMATES</b></p> <p>24. PRIMARY FACILITY</p> <p>25. QUANTITY</p> <p>26. UNIT COST</p> <p>27. COST (\$)</p> <p>28. SUPPORTING FACILITIES</p> <p>29. QUANTITY</p> <p>30. UNIT COST</p> <p>31. COST (\$)</p> <p>32. TOTAL PROJECT COST</p> </div> <div> <p><b>SECTION C - BASIS OF REQUIREMENT</b></p> <p>33. REQUIREMENT FOR PROJECT</p> <p><b>PROJECT:</b> [ANSWER QUESTION - WHAT DOES THIS PROJECT PROVIDE? EXAMPLE: CONSTRUCTION OF A NEW PLANT FOR MANUFACTURING ...]</p> <p><b>REQUIREMENT:</b> [ANSWER QUESTION - WHY DOES IT REQUIRE THE PROJECT? IN GENERAL THE FACT THAT IT IS SUBSTANDARD IS NOT BASIS OF REQUIREMENT.]</p> <p><b>CURRENT SITUATION:</b> [TELL HOW IT IS BEING DONE NOW AND CONDITIONS. THIS SHOULD SUPPORT REQUIREMENT LAST SENTENCE GIVE DISPOSITION OF EXISTING FACILITIES, I.E., DEMOLITION, ETC.]</p> <p><b>ADDITIONAL:</b> [USE FOR VALID IMPACT STATEMENT, &amp; SAVING &amp; NATO STATEMENT.]</p> </div> </div>													
<p><b>QUANTITATIVE DATA</b></p> <p>34. TOTAL REQUIREMENT (U/M)</p> <p>35. EXISTING SUBSTANDARD</p> <p>36. EXISTING ADEQUATE</p> <p>37. FUNDED, NOT IN INVENTORY</p> <p>38. ADEQUATE ASSETS (E + Q)</p> <p>39. UNFUNDED PRIOR AUTHORIZATION</p> <p>40. INCLUDED IN FY PROGRAM</p> <p>41. DEFICIENCY (Q - E - I - Q)</p> <p>42. RELATED PROJECTS</p>													

FIGURE 3.2: The DOD Form 1391

precisely (53:para 6-2). Thirty to forty percent of projects developed to the project book level are disapproved in Congress yearly (12). This represents an extensive waste of time and effort. If the input of standard facility information into PB's could be increased, less time would be expended in PB development. Efforts to standardize as much PB information as possible could increase the benefits of facility type information packages. The extreme of this situation would be a "fill in the blank" facility type information package adequate for Congressional review. Identification of required PB information would provide a potential list of areas for standardization of certain information. Although Appendix G contains the detailed listing of Project Book information, it will be useful to summarize the general information categories here:

#### Design Guidance

- A. Project requirement scope
- B. Site considerations
- C. Special considerations
- D. Architectural and structural considerations
- E. Mechanical considerations
- F. Electrical considerations
- G. Water supply/waste
- H. Environmental
- I. Fire protection

#### Project Support Requirements

- J. Cost estimate worksheets
- K. Justification calculations
- L. Air conditioning load estimate
- M. Energy impact statement
- N. Majcom review comments
- O. Solar energy systems

Information which could help in the development of PB's would be either standard information or guidelines for considerations in each of these listed areas. This is the approach in the design guides.

#### 4. Design.

The information needed for programming is the information needed for design. A program is a design information package. If a program is complete, then no further information should be required for design. The completeness of a program refers to the inclusion of the four areas of information mentioned earlier--general Air Force construction information, base specific information, construction information, and site specific information. The provision of any of the required information or guidelines for its collection would be an economical ingredient of a facility type information package. Common ingredients of a facility type information package might include such things as space requirements, health and safety considerations, information on growth and flexibility, space interrelationships, cost information, and allowance for incorporation of site specific information.

#### 5. Construction.

During construction, contract drawings and specifications are converted into a facility. If questions arise during the construction process it may be necessary to

refer back to the information used for facility design. The information used for evaluation in all previous stages is helpful here also.

#### 6. Operation and Maintenance.

The operation and maintenance of a facility requires a knowledge of its components. The facility type information package can provide this knowledge.

The discussion of content requirements has been limited to identification of general areas of content only. The general areas of information that have been identified are: (1) purpose, (2) functions, (3) space requirements, (4) health and safety information, (5) information on growth and flexibility, (6) interrelationships of space, (7) identification of users and use patterns, (8) cost information, (9) example floor plans, and (10) guidelines for incorporating site specific information.

#### 7. Other.

Other ideas for inclusion into facility type information packages were identified by several authors. Some of these ideas will reflect ideas covered in Table 3.2 but will be repeated for emphasis. The other suggestions for content of facility type information packages were:

1. Define user groups, the organizational processes and the differing needs and use patterns of each (2:78; 14:5; 16:7; 45:49-51)

2. Provide information on the content and scope of the package (10:49; 51:104-105)
3. Provide information on how to use the package (11; 10:49)
4. Provide a process for user input and feedback (37:79; 29:229)
5. Provide references for further study or validation (26:34; 37:45; 53:para 6-1)
6. Give objectives and criteria (even as ranges) to measure against in a prioritized format (16:8; 37:45)
7. Include an index of terms to allow a reader quick access to a definition of any unfamiliar terminology (10:82)
8. Use information modules for particular functions which can be transferred to other packages such as work station information usable in all facilities with clerical components (15:30-31)

The content requirements chosen by the author to be the criteria for development and evaluation of a facility type information package are:

- Guidelines for choosing facility types for development
- Guidelines for choosing level of detail and flexibility
- Information provided on
  - Purpose
  - Facility requirements
  - Space requirements
  - Health/safety
  - Growth and flexibility
  - Interrelationships of space
  - User identification and patterns
  - Cost information
  - Example floor plans
- Guidelines for incorporating site specific information
- Guidelines for user input and evaluation
- Criteria provided for evaluation of
  - Technical
  - Functional
  - Behavioral
- Table of contents provided
- Instructions for use
- References provided

Prioritized format  
Index of terms  
Use of information modules

### Communication Requirements

Design information is prepared to achieve cost or quality control, to facilitate planning, design, or management, or to standardize facilities; however, these goals are often not met. In many cases, the failures are caused by poor design information. A reader may have difficulty locating information in a document, and even if the information is found, it may be difficult to understand, internally inconsistent, incomplete, erroneous, or in conflict with other documents. The document may be inefficient, requiring the reader to spend too much time locating, reading or comprehending what is presented. As a result, design information may be ignored, misapplied, or misunderstood. In turn, the facility the reader is concerned with may be nonstandard, expensive, of poor quality, or delayed in delivery [10:11].

Orchestration of the data (sequence, clarity, accessibility, groupings, major headings) is as important as the information itself [59:64].

These two statements signify the importance of a document's ability to communicate the intended messages to its readers. The document, in its format and terminology, should permit all concerned with its contents to understand, abide by, and implement its conclusion (2:94; 29:230). This communication must meet the needs of a variety of users (33:7; 59:13-16). Communication is based on the assumption that people will use information if it is helpful, easy to use, and easy to find (10:53-54). The primary finding of the literature review was the importance of the graphical form of information communication in the delivery of design

information. As a preface to an extensive discussion on graphics, other recommendations for communicating design information are discussed.

1. Give information only as needed (36:40).

Effective communication tries to avoid either giving too much information and thus obscuring the message, or giving oversimplified information so that no message is conveyed (30:20). By delivering information only as needed, the potential for reduced information costs is possible.

2. Use a hierarchical presentation from general to specific (30:21; 29:230; 10:13-15; 37:45; 59:194; 33; 23:20; 57:119-120; 36:40).

A hierarchical presentation of information enables the reader to read for generalities with ease. The hierarchical presentation discussed by the various authors refers to both the detail level of the information content and the use of headings. Hierarchical presentation of information detail refers to a movement from general to specific information. General to specific categorization necessitates information grouping. This grouping of information, combined with hierarchical headings, makes information easy to find, which saves time; a saving of time equates to saving money. Hierarchy can also represent levels of importance, and thus a priority system for use in the potential conflict resolution of stated goals is available.

3. Keep it simple (10:65; 26:34; 37:40).



Simplicity allows for ease of use and understanding. The elements of simplicity identified in the literature were the use of short words and sentences (ideally 1 1/2 syllables per word average), the use of standard page layouts (allows quick reference), the inclusion of chapter and section title on each page (to allow ease of assembly, disassembly and update), and the use of stand out topic headings.

4. Give prescriptive rather than descriptive information (21; 36:62; 15:30-31).

Prescriptive information tells how things ought to be rather than how they are or can be. Prescriptive information establishes standards or rules to govern design whereas descriptive information may give examples. The general idea behind prescriptive information is to relay design concepts instead of design solutions. Examples of design concepts are concepts like shelter or convertability, whereas the design solution could be a roof and a folding door, respectively. The use of prescriptive information affords the flexibility desired of design information to allow for economical, functional and aesthetic solutions.

5. Sequence the data in the way it will be used (37:45; 59:63; 26:2).

This allows ease of use of information as well as a recognizable format for information referencing.

6. Use summary sheets (59:63).

Critical information restated in summarized form

provides an emphasis which reduces the possibility of omissions.

7. Use graphics (4:122-123; 15:31; 10:92; 26:34; 27:115; 37:45; 45:186; 57:110-141; 59:63).

There are several reasons why the use of graphics is important. First of all, architects, the primary users of facility type information, have shown a preference for information presented in a visual format rather than the verbal or statistical forms (33; 30:9; 37:45; 26:36).

Architects have always used systems thinking as a basic concept of architectural design. Because of this architects have developed a unique form of thinking--visual thinking. Through sketches architects communicate with others and himself in a special way that constantly focuses on the system characteristics of each problem [30:10-11].

Graphics are also wanted by the clients (45:186; 13).

Drawings are basic to communication between the client and the architect. Graphics aid decision conveying (4:122-123).

There are several advantages in the use of graphics that may help explain why they are preferred.

- a. Graphics aid synthesis of information (30:6; 14:1; 10:82)

Verbal language focuses on linear logic and detail while visual language is suited to simultaneous relationships and synthesis. As the amount of information increases, the verbal, sequential level of thinking becomes increasingly strained. By condensing and grouping verbal information into graphics, more information can be effectively processed (30:10-11). Graphics can make potential problems

or conflicts more visible earlier in the design process, allowing early solutions which cost less than the solutions needed for conflicts discovered after facility construction. Graphics aid in decision making (4:122-123).

- b. Graphics are more economical to use than verbage (26:38,48; 33; 14:3; 10:82).

Graphics can condense or compress information, thus allowing more information per amount of space. Tables and charts, a form of graphical presentation, can illustrate points more clearly and may allow additional information to be derived. Graphics save the reader time.

- c. Graphics reinforce or emphasize (30:93; 14:3; 10:82)

Comparisons or contrasts are more readily displayed if shown graphically rather than in written form. Graphics can also expand upon the written text in the form of examples and illustrations.

- d. Graphics hold and focus attention and increase interest (14:3).

The longer a written document, the more effort that must be directed toward maintaining reader interest. Graphics can help.

- e. Graphics aid quick referencing (27:115).

Designers working on a project seldom have the time or the inclination to read data descriptions when actively involved in the visual language of drawing. Graphics convey information in an abbreviated and more easily recognized form.

- f. Graphics present design information in the form in which it will be used (33; 59:63; 26:48).

Client needs and other facts at the data gathering stage are largely in written format. As architecture is a physical (visual) expression of the solution to a problem statement, information must progress from the written format through the graphical format to the physical format. (See Figure 3.3)

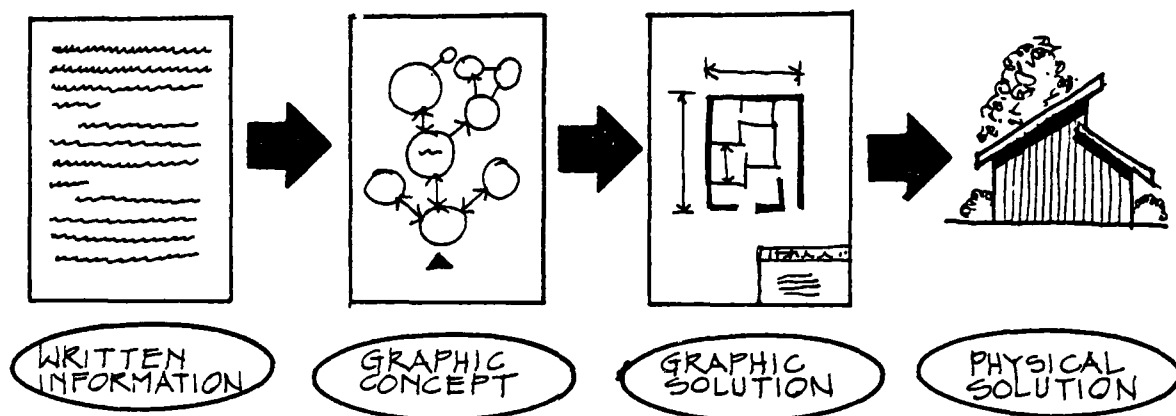


FIGURE 3.3: The Transformation of Information.

Expressing information in the form it will be used in, graphically, reduces the time spent transferring information from one form to another.

8. Graphics should be related to text (26:34, 15:31; 33:80).

This relationship should be physical as well as contextual. The graphic images used should be specific enough to clarify the thought but general and abstract enough to evoke a range of design possibilities.

The communication criteria identified in the literature and to be used in the development of a facility type

information package are:

- Relates to all potential users
- Information given only as needed
- Hierarchical presentation
- Simplicity
- Sequential
- Use of graphics
- Graphics with text

### Accessibility Requirements

The ability and time needed to gain access to both the quality and quantity of information needed for a particular function can affect the efficiency and effectiveness of that particular function. For example, information delays or inaccessibility in design can affect both the cost of design and potentially the cost of the facility. Accessibility of information refers to who needs what, when, and how often. The "who" has been identified.

### What Is Needed=Detail

The areas of information needed for a particular use were identified in the contents sections of this chapter. The degree of detail required by each was not. The degree of detail and amount of information required by a particular user increases as the user approaches the design stage. Information requirements for design are more detailed than information requirements at any other stage in the building delivery process. (See Figure 3.4)

For example, planners and programmers require only

gross estimates of areas and rough estimates of cost, whereas designers require detailed estimates of square footage by areas and more accurate estimates of expected costs.

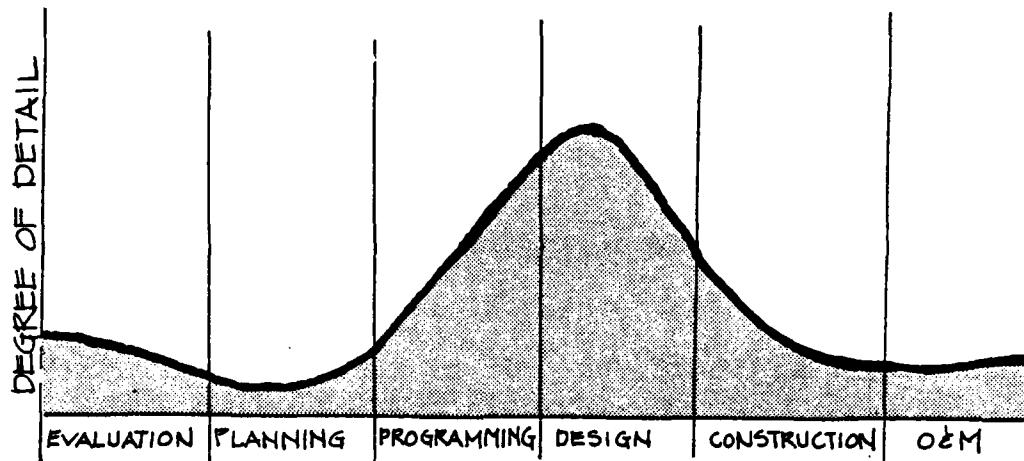


FIGURE 3.4: Degree of Information Detail

#### When=Time Span for Delivery

Another aspect of accessibility is the time span necessary from the identification of an information requirement to the user's receipt of that information. The allowable time span for information delivery is a function of the length of time between the date of need identification and the due date for completion of the process for which the information is needed. The requirement for delivery of information is that information should be accessible in the time frame needed. Information packaged according to the expected needs of the users and ready for delivery increases the accessibility of information.

### How Often=Frequency of Use

A final consideration of information accessibility is the frequency of use. There is a cost involved with delivery of information. Information is a resource which yields a benefit and a cost. The benefit of information should exceed the cost to obtain that information. The benefits of an information package accrue with the frequency of use. More benefits are accrued if a package is used monthly than if it is used only yearly. If the package is not used, then no benefits can be attributed to the information package. The frequency of use of facility type information packages should be used in determining the required accessibility to users.

The survey conducted for this research examined the frequency of use of Definitive Designs. The results are shown in Table 3.4.

The command level respondents were also asked to indicate how often they thought Definitive Designs were used at base level. The results are shown in Table 3.5.

These tables indicate two things. First, Definitive Designs were used more by the upper level respondents than the base level respondents and second that use by base level respondents was lower than was perceived by the command level respondents. The tables also indicate the respondent usage of Definitive Designs averaged about once a year for each base level user.

These choices made on the accessibility of information can affect the updating and the costs of facility type information packages.

Table 3.4

<u>Definitive Design Usage</u>	
<u>Command Level Users</u>	<u>Base Level Users</u>
0% . . . . . Daily . . . . .	0%
9% . . . . . At Least Once a Week . . .	0%
35% . . . . . At Least Once a Month . .	20%
30% . . . . . At Least Once a Year . . .	47%
26% . . . . . Not At All . . . . .	33%

Table 3.5

<u>Perceived Versus Indicated Usage of Definitives</u>	
<u>Command Level Perception</u>	<u>Actual Reported</u>
0% . . . . . Daily . . . . .	0%
19% . . . . . At Least Once a Week . . .	0%
33% . . . . . At Least Once a Month . .	20%
33% . . . . . At Least Once a Year . . .	47%
15% . . . . . Not At All . . . . .	33%



The criteria for accessibility are:

Information detail by user requirements  
Delivery times adequate  
Frequency of use considered?

#### Evaluation and Updating Requirements

One use of facility type information packages is to evaluate a facility in terms of technical, functional, and behavioral aspects. An effective evaluation tool, itself, must also be evaluated. The use of a facility type information package to evaluate facilities implies the incorporation of recognized facility patterns or standards in that package. As was stated earlier, these packages should be part of an evolutionary process that periodically requires a reevaluation of the standards and patterns used in the package. Evaluation of facility type information packages should theoretically occur after every use. This would allow the most expeditious updating of the provided information.

Reexamining the evaluative use of facility type information packages in the building delivery process can show the potential points of package evaluation. Technical evaluation occurs most frequently at facility completion. Functional and behavioral evaluations must necessarily be post occupancy evaluations, after the users have "settled in." Post occupancy evaluations are analagous to that of the case study method in business--that is, to make better

decisions with a knowledge of the consequences of decisions made in the past (45:413; 59:13-16).

Evaluation and feedback may also occur during the construction process. For example, if a project consists of several repetitive buildings such as a dormitory project consisting of five buildings, deficiencies noted in the first building should be correctable before the deficiency is included in future buildings.

Evaluation may also occur when a facility has had numerous renovations or when the facility use changes (29:325). Examination of renovations may demonstrate deficiencies in initial design or a change in user requirements common to a facility type.

Evaluation of facility type information occurs at various stages. Updating of the information should occur whenever changes of information are deemed appropriate--after examination of evaluatory feedback (37:45). This will prevent any noted deficiencies from being implemented. Packages of facility type information should be reevaluated once a year as a minimum (13). If deficiencies are found, corrections should be made. Updating of information can be less expensive if single sheets can be replaced. A loose-leaf binder has been suggested for this purpose (11; 10; 25).

Evaluation of package content, format and usability can be evaluated with each use, if the package contains a

form to incorporate user feedback which can be mailed to the developers and caretakers of the facility type information.

In summary, it can be seen that facility type information packages are used to evaluate facilities, and that such use involves an evaluation of the package itself. (See Figure 3.5)

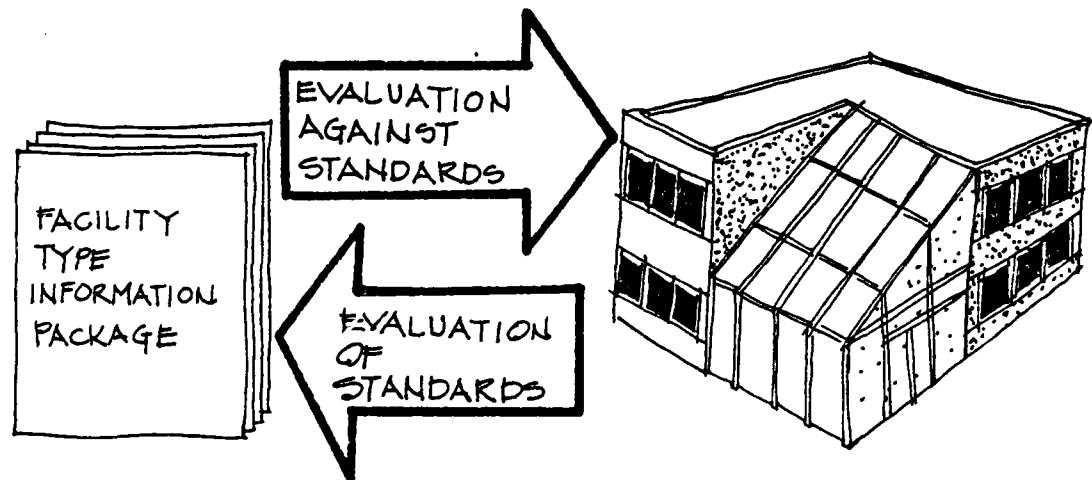


FIGURE 3.5: Evaluation--Package and Facility

The characteristics of evaluation and updating which will be used to develop and evaluate the proposed facility type information package are:

- Provision for package evaluation
- Updating process readily accessible
- Simplicity of update.

#### Cost Information

The bottom line in the consideration of all the criteria for development of facility type information is cost. Figure 3.6 summarizes the criteria and demonstrates their interrelationships.

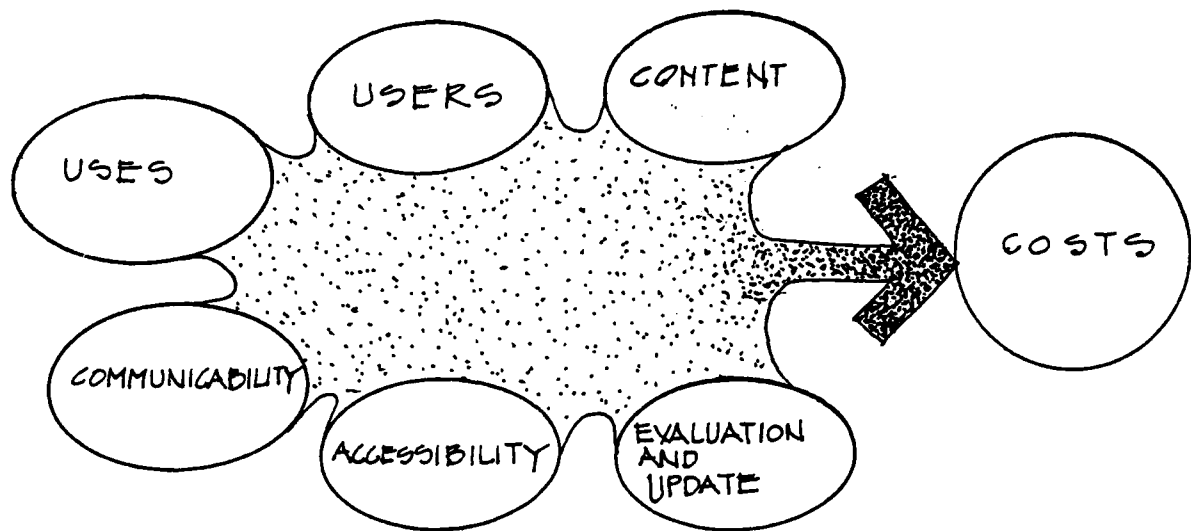


FIGURE 3.6: Criteria Relationships

The primary concern is to reduce facility type information package (FTIP) costs while at the same time maximizing or increasing the benefits received. This implies a benefit/cost ratio comparison of alternate solutions in the development of a facility type information package. The implications of a benefit/cost (B/C) analysis are the quantification of costs and of benefits. While the costs of delivering a package of facility type information are somewhat easily quantified, the quantification of benefits is not. B/C analysis is still possible using the "B/C way of thinking" (5:288). If more benefits can be accrued for the same cost or if the cost for obtaining equivalent benefits can be reduced, then the benefit/cost ratio is improved.

The total cost of any method to transmit facility type information consists of four subsidiary costs:

development, reproduction, delivery, and updating. Development costs are the initial costs of gathering, organizing, and presenting the information. The characteristics which can affect development cost are content (ease of information retrieval and the amount necessary), the users and the required communicability and the evaluation and update process required.

Reproduction costs occur after initial package development. They are the costs of multiplying the number of copies from an original. The amount of content affects the length of the document, which directly affects reproduction costs.

Delivery costs are dependent upon the amount of information to be delivered to respective users and the number of those users. Updating costs are the costs involved in the evaluation and updating of facility type information packages.

The benefits of a facility type information package might include the provision of more or better information or possible reductions in a user's time or other reduced costs not mentioned earlier.

Analysis of the benefit/cost ratio for a system can indicate the value of one system of transmitting facility type information over another system. Table 3.6 indicates a benefit/cost analysis of definitive designs versus design guides, which provide more information and more flexibility (a benefit).

Table 3.6

Cost of Definitives Versus Design Guides

	DEFINITIVES	DESIGN GUIDES
<b>Development</b>		
A. Cost per facility type		
cost/page.	6000 <sup>(11)</sup>	1000 <sup>(11)</sup>
X avg # of pages/facility.....	2	35
TOTAL COST/FACILITY.....	12000	35000
B. Cost per system of facility types		
cost per facility..	12000	35000
X # of facility types.....	329 <sup>(11)</sup>	250 <sup>(11)</sup>
	3,948,000	8,750,000
<b>Reproduction</b>		
A. Reduction - total pages/system....	658	8750
X reduction cost/page.....	12 <sup>(2)</sup>	0
TOTAL REDUCTION COST.....	7896	0
B. Printing - total pages/system.....	658	8750
Printing cost/1000 pages..	45 <sup>(2)</sup>	20 <sup>(2)</sup>
TOTAL PRINTING COST/SYSTEM	30	175
	7926	175
<b>Distribution</b>		
printing cost/system....	30	175
X # systems distributed...	150 <sup>(*)</sup>	150 <sup>(*)</sup>
	4500	26,250
<b>Updating</b>		
cost per page.....	6000 <sup>(11)</sup>	20 <sup>(**)</sup>
Estimated average 1% /year	7	88
	42,000	1,760

\* based on number of AF bases

\*\* author estimate

<b>TOTAL</b>	<b>4,002,396</b>	<b>8,778,010</b>
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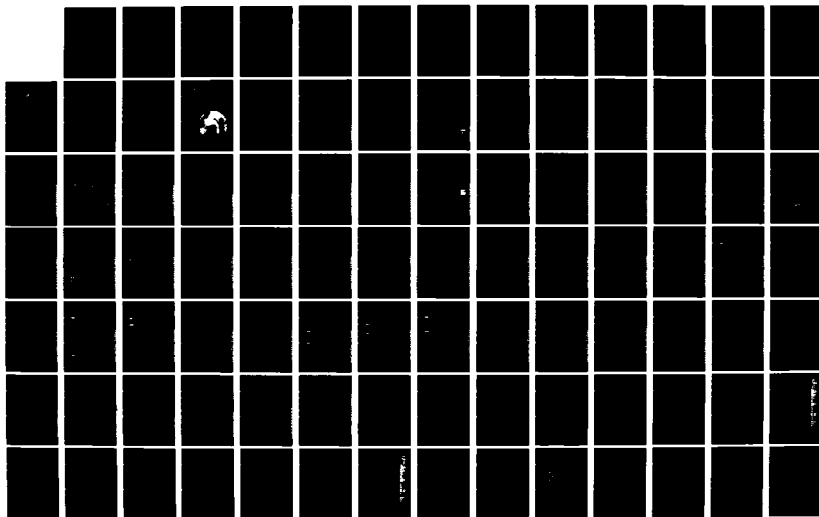
AD-A125 381

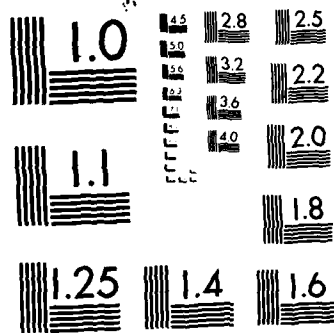
DEVELOPMENT OF FACILITY TYPE INFORMATION PACKAGES FOR  
DESIGN OF AIR FORCE. (U) AIR FORCE INST OF TECH  
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. C D BASHAM  
MAR 83 AFIT-LSSR-83-82 F/G 3/1

2/4

UNCLASSIFIED

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A



Examination of Table 3.6 reveals that the costs of a design guide are greater than the previous definitives. The choice to move toward the design guide approach is based on the benefit expected from the increased amount and accuracy of the information provided in the design guides. Any proposal to replace the current design approach must be less expensive than the design guides, provide an increase in benefits at the same costs, or show that a suggested value of proposed benefit is greater than the cost to include the benefit. Potential areas to examine are: (a) reduction of development fees, (b) reduction of reproduction costs, (c) reduction of delivery costs, (d) reduction of updating costs, (e) reduction of fees of AEs who use the package (benefit), and most important, (f) incorporation of information which can lead to other cost savings (i.e. a better design solution).

#### Reduction of development fees

As stated earlier in this chapter, choices in the development of facility type information packages include choices of which facilities to develop information packages for and to what level each should be developed. More detailed information is provided in the design guides than in the definitive designs. In a representative copy of a single facility type information package, the design guides take approximately 35 pages at a cost of \$35,000 and the definitive takes an average of 2 pages to define a single

facility at a cost of \$12,000 (11; 12). Apparently as the level of detail increases so does the cost of developing of information for a facility type. If facilities can be categorized by differing required levels of detail, and not all require development to the extent of a design guide approach, then costs of the complete system can be reduced.

#### Reduction of reproduction costs

The most logical way to reduce reproduction costs is to reduce the number of pages. The use of graphics to replace text can reduce the amount of text required. If graphics are used to emphasize the text more space is consumed. The potential reduction of pages due to the use of graphics depends on whether the majority of the graphics reduce or expand the text.

#### Reduction in delivery costs

In order to reduce delivery costs two possible approaches seem apparent. One is to reduce the number of copies delivered and the other is to reduce the cost of delivery by using a less expensive method of delivery.

#### Reduction in updating costs

The smaller the amount of total package information handled during the update of a single item, the less expensive the update will be.

#### Reduction of the fees of AE's who use the package (benefit)

According to D'Orsery, Hurst and Co., management consultant with broad experience in architecture and

engineering, preliminary design is the phase of a project which presents the architect with the most difficult problems of time and cost control. Ordinarily only 20% of the fee is allowed for preliminaries, but frequently twice that is used (2:89-92). If information can be provided which reduces an AE's preliminary design effort, then either a cost savings or an increase in the quality of design should result (44). Either increases the benefits of a system.

If a package is sufficiently detailed as a definitive design rather than a design guide, then the government should be paying for drafting services rather than professional services (22:70). This would cause a reduction in fees.

#### Incorporation of information leading to other savings

As mentioned earlier, facility type information packages are but a single input into project booklets which go to Congress for approval of major construction projects. Thirty to forty percent of projects developed to the project book detail level are disapproved in Congress yearly (13). If facility type information packages can be standardized to also include all information necessary for Congressional submittal, then the repetitive occurrence of extensive time commitments to PB development could be halted and costs savings recognized as another potential benefit.

Another idea by Burrill is the realization and

inclusion of information modules (15:31). Information that is pertinent to a specific function common to several facility types should not have a development cost for each facility type information package. For example, information on toilet facilities for facilities requiring mass public usage could be handed to the developer of a facility type information package for "cut and paste" inclusion. The developer would then have less to develop and the fees should so reflect this change.

A final idea is the incorporation of cost per criteria. If criteria for a facility have been identified rather specifically and prioritized and a cost can be attached to each criteria, then making of design decisions is simplified. For example, if a client wants items A or B, C or D, and E in that order of priority, then if A costs less than B, A would be chosen.

The bottom line in weighing the alternatives of transmitting facility type design information is costs. Criteria taken from a benefit/cost analysis can be used to evaluate the effectiveness and efficiency of a proposed package. These criteria are:

- Reduction of development fees
- Reduction of reproduction costs
- Reduction of delivery costs
- Reduction of AE fees
- Package OK for Congressional review

Increase in benefit/cost ratio  
Cost/criteria information  
Reduction of total system costs.

#### SUMMARY

Chapter III has included several sources for the identification of criteria to be used in the development and evaluation of a package to transmit facility type information. These are provided in checklist form for ease of use in Table 3.7.

## CRITERIA CHECKLIST

FULL COMPLIANCE ☒ PARTIAL COMPLIANCE ☐ CRITERIA NOT MET

## CHAPTER IV

### THE PROPOSAL AND ITS EVALUATION

#### Introduction

This chapter presents some guidelines for developing and using a proposed facility type information package, an example of the package, and an evaluation and comparison of the proposed facility type information package using the criteria identified in Chapter III and displayed in Table 3.7.

#### Guidelines For Package Development

##### Choose a FTIP Category

I suggest that the development of facility type information packages be divided into categories according to the amount of detail and flexibility required for development. These are the categories proposed and the criteria for choosing each category.

##### 1. Category One.

This category involves the development to a level similar to the current Definitive Designs. This designation for development would reflect a decision to limit flexibility to siting conditions such as foundation adjustments. Facility types which are proposed for this category are those whose primary purpose is functional. This functional requirement would be well established and

almost void of human/facility interactions. An example would be a bomb storage facility.

## 2. Category Two.

This category involves development to a level similar to the bubble diagram stage but would also include example floor plans for reference. More flexibility is awarded by this approach, yet package length is still small. Facilities which would be categorized in this area would be those with fairly simple technical and functional considerations but with a simple behavioral requirement also. An example could be, for instance, a concession stand for a sports complex. Variation would be limited to superficial treatment.

## 3. Category Three.

This category would provide the level of information detail shown in the design guides with a primary emphasis on recording detailed technical or function requirements. Behavioral factors would be considered but primary emphasis would be on the technical and functional aspects. An example of this category would be a facility type information package for a computer center. This category of packaging facility type information would include an extensive technical checklist for the designer.

## 4. Category Four.

Requirements for a category four classification are extensive behavioral considerations. This final category



would reflect the level of detail and presentation shown in the child care center example. Behavioral considerations are largely unquantifiable, so requirements are stated but criteria for measurement are vague. Examples to be included in this category would be Morale, Welfare, and Recreation facilities which are highly people oriented.

The identification of behavioral criteria for design is a new field and the research being done by the Army's Construction Engineering Research Laboratory is advancing the state of the art. As criteria are identified and tested, they should be incorporated into FTIP packages.

The four categories suggested should include increasing levels of detail and information. Each successive package should incorporate the type of information provided in all preceeding packages. The facility types presented in Appendix C, a listing of facility types and scopes in AFM 88-2, are also shown with the appropriate FTIP category numbers which were proposed by the author.

#### Choosing a Developer

The choice of who should develop facility type information packages is a factor in the quality of the package. The developer should be an experienced architectural programmer. As mentioned in Chapter I, architectural programming is a new field. The importance of programming requires that equal importance be placed on who does the programming. If the developer of an Air Force facility type

information package is an experienced architectural programmer, then no previous experience in Air Force work is necessary because a good programmer will cover all relevant design concerns.

The input to the facility type information package should include information gathered from an extensive literature review and a current evaluation of similar existing Air Force facilities. This evaluation should include utilization of current information gathering, organization, and analysis techniques.

#### Provide for Feedback

The evaluation of facility type information should be a continual process starting with actual development through facility operation. Updating should occur at any time a change is required. Changes are identified in the evaluation process. Evaluation occurs first during package development. This evaluation is by the users of the facility type information package. A second and third evaluation should occur at the completion of facility design and facility construction. Problems or deficiencies in an FTIP should be noted by the design user and construction inspection user. Final evaluation should be by facility users at various stages in the facility's life.

User evaluation forms included in the FTIP should be used to increase user feedback. The provision of a readily accessible evaluation form will most likely increase

feedback and thus a more effective package and information evaluation.

### Guidelines For Use

The proposed facility type information package has been developed and divided in such a way as to provide information in a package most appropriate for each respective user. The three types of packages are (1) programmer's package, (2) evaluator's package, and (3) designer's package.

#### Programmer's Package

The first sections of the package are titled "general" and "programming." The information provided in these sections is sufficient to allow rough initial project programming. The type of information given includes category codes, facility purpose, gross square footages, siting consideration, and rough component costing. (See Figure 4.1)



FIGURE 4.1: The Programmer's Package

#### Evaluator's Package

The evaluator's package consists of the general section, the criteria checklists, and the evaluation forms.

The package is to be used for user evaluation of the facility (post-occupancy evaluation) and evaluation of the technical and functional aspects upon completion of construction. (See Figure 4.2)



FIGURE 4.2: The Evaluator's Package

#### Designer's Package

The designer's package is the complete body of information available in the appropriate FTIP. (A category four Facility Type Information Package would contain all three packages discussed.) The design package contains information on what was programmed, what is required (checklist) and, most important of all, why it is required.

(See Figure 4.3)

The division and respective user distribution of information in the proposed facility type information package should serve to decrease the costs of information handling by providing only required information. The facility projects requested but not funded will have utilized only a programmer's package for its submission. This allows more efficient distribution of costly information.

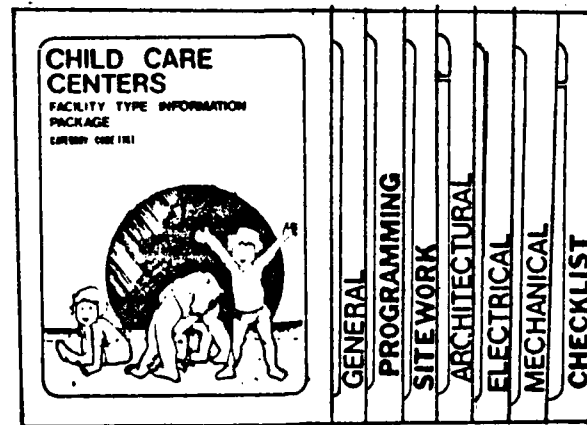


FIGURE 4.3: The Designer's Package

#### Example of a Facility Type Information Package

An example of a facility type information package is presented so that the reader can visually compare the method proposed here with the previous methods of transmitting facility type information. Examples of the previous methods are presented in Appendices A, D, and E.

The choice of facility type to prepare a package on was based on three reasons. The first reason was the accessibility of prepackaged information on a facility type. The process of collecting and organizing all possible information on a facility type is quite an extensive endeavor. The Air Force has already gathered and processed information on two facility types in the form of design guides. These two were for a child care center and an auto hobby shop.

The information used to develop these two design guides included Air Force regulations and manuals, an extensive literature review, knowledge from the professional experience of its developer, and an analysis of previously

constructed facilities. The accessibility of such a package of information was an indispensable tool in saving time and effort involved in the development of a facility type information package.

A second reason for choosing child care centers for the example is the ability to compare the proposed packages with previous packages. Presently, design guides have only been developed for child care centers and auto hobby shops. The choice to develop an FTIP for any other facility type could not be compared with the design guide approach.

The final reason for choosing the child care center for an example is the type of information common to a child care center. Facility type information can be functional, technical, or behavioral. Establishing criteria for technical requirements is straightforward. A requirement is either met or not met. Functional criteria are less exact, and the establishment of behavioral criteria is a new area under development (9; 20; 33; 37). The majority of information pertinent to a child care center is behavioral type information. The presentation of behavioral requirements and criteria is a challenge of a facility type information package development.

The example of a facility type information package for a child care center contains information from the design guides primarily and from other sources of information on

child care centers (3; 6; 7; 18; 34). The guide for collecting site specific information was derived from other forms of a design information checklist (40; 49; 56).

The organization, page layouts, and handprinted passages and drawings of the example facility type information package are author generated additions. The full size typewritten passages are adaptations of passages from the design guides. The reduced typewritten passages are direct quotes from the Air Force design guides for a child care center.

Figure 4.4 demonstrates the three types of print used.

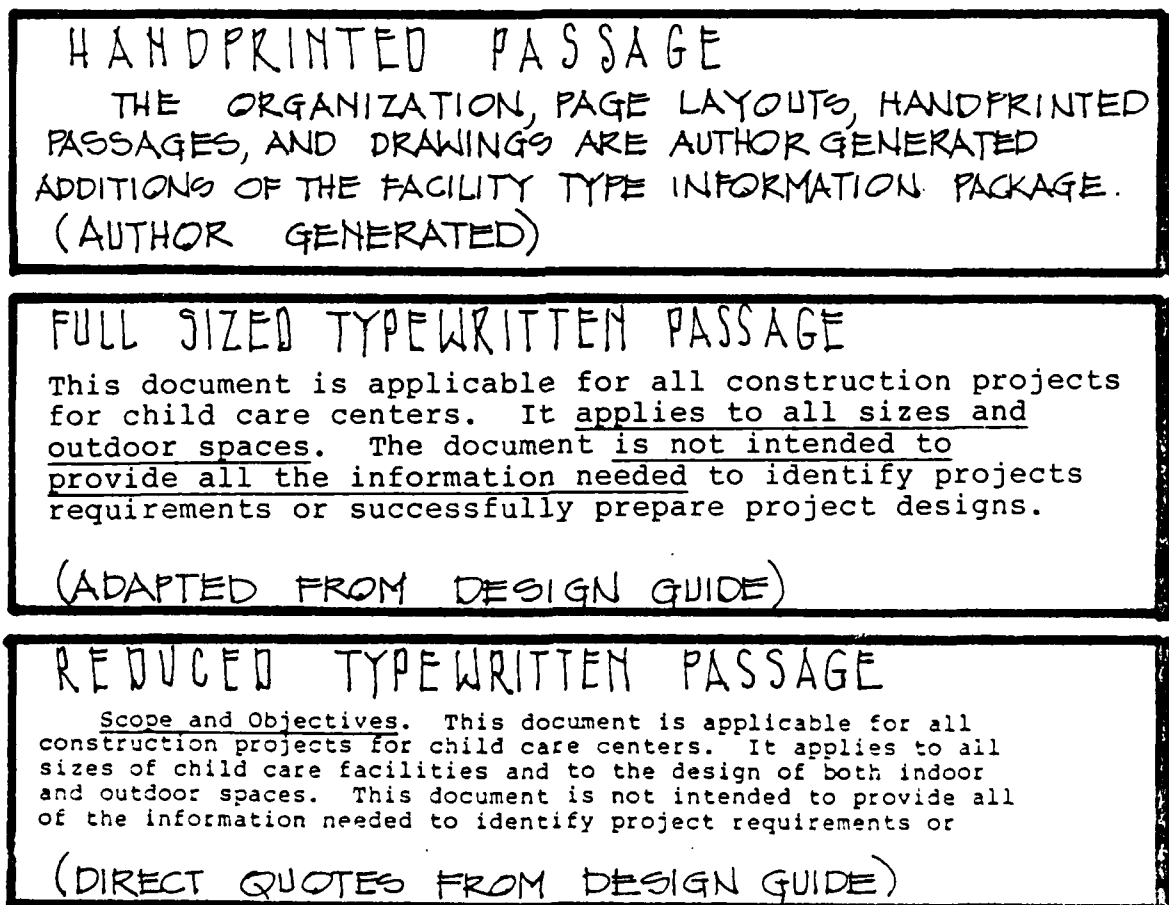


FIGURE 4.4: Print Types Used in the Example FTIP

# CHILD CARE CENTERS

## FACILITY TYPE INFORMATION PACKAGE

CATEGORY CODE (74)





# child care centers

G-1

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# child care centers

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## DIRECTIONS FOR USE

THIS PACKAGE IS TO BE USED TO AID IN THE DESIGN OF A CHILD CARE CENTER. THIS PACKAGE PROVIDES INFORMATION ON SPACE ALLOCATION FOR FOUR DIFFERENT SIZES OF CHILD CARE CENTERS (SEE PAGE P-2). THE ARCHITECTURAL SECTION HAS BLANK SPACES PROVIDED (SEE FIGURE ONE) TO ALLOW FOR APPROPRIATE SQUARE FOOTAGES OF SPACES TO BE INSERTED FOR EASE OF FUTURE REFERENCE.

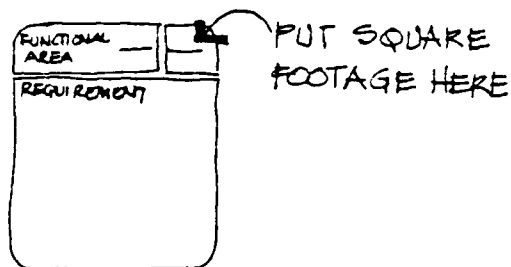


FIGURE ONE : EXAMPLE ARCHITECTURAL PAGE

THIS PACKAGE HAS BEEN DESIGNED TO ALLOW EACH RESPECTIVE DESIGNER TO OBTAIN A DETACHABLE PORTION WHICH IS SPECIFIC TO HIS OR HER FIELD. (I.E. ELECTRICAL, MECHANICAL, ETC.)

THE USER OF THIS PACKAGE IS EXPECTED TO OBTAIN AND INCORPORATE THE APPROPRIATE SITE SPECIFIC INFORMATION FOR THE SUCCESSFUL DESIGN OF A CHILD CARE CENTER.

THE USER IS REQUESTED TO FILL OUT AND RETURN THE ATTACHED USER EVALUATION FORM AT THE END OF THIS PACKAGE SO THAT THIS PACKAGE MAY BE IMPROVED UPON AND MAY BETTER SERVE YOU AND THE AIR FORCE IN THE FUTURE.

CEAICAI

# child care centers

G-3

## PURPOSE

This facility type information package (FTIP) provides the basic criteria to evaluate, plan, program, and design child care centers, including new construction, major or minor renovation, and changes to existing facilities.

## SCOPE

This document is applicable for all construction projects for child care centers. It applies to all sizes of child care facilities and to the design of both indoor and outdoor spaces. This document is not intended to provide all of the information needed to identify project requirements or successfully prepare project designs. Additional information shall be obtained from the installation pertaining to the unique requirements of the location. Guidelines for obtaining site specific information are presented throughout this package.

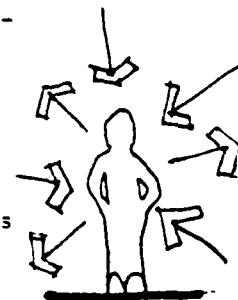
## PHILOSOPHY

1. Importance of child care. A child care facility has considerable responsibility in the community. Its role is to offer a developmentally sound program which goes beyond caretaking. The first experiences for young children in group situations should be ones which develop a sense of joy, wonder, and curiosity in the world around them. One of the most important objectives of a good program is to assist children to develop a positive self-concept. When children feel good about what they can do, when they recognize the love and friendship of caregivers and other children, and when they have confidence in themselves, they will be more receptive to other learning opportunities.

2. Child development and child care.

a. Much of the child's development occurs spontaneously from unstructured activities--play where the child is learning and growing from his or her own initiative, exploration, and discovery. Learning also occurs from structured and semi-structured situations. Optimal early childhood development is enhanced by a complementary balance of unstructured play experiences interspersed with structured learning.

b. Child development occurs by adding knowledge or abilities and by passing through a series of stages or major periods of development. Stages evolve in a fixed order of succession and follow an invariant sequence for all children.



STRUCTURED

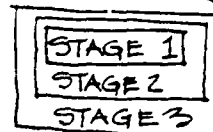


UNSTRUCTURED

# child care centers

G-4

Each stage is characterized by behavior that is different from that of the preceeding stage. Each stage also integrates all behaviors possible at previous stages, consolidates them, and prepares for development toward the next stage.



(1) Infancy, from birth to about 18 months, is the period when rapid changes of a child can be noted in terms of intellectual as well as physical development. This period is characterized by the sequential acquisition of abilities such as locomotion and grasping. An infant's behavior is centered around manipulation of objects and the performance of activities for the simple sensation and pleasure of it.

INFANCY  
0-1½ YRS

(2) The change from infancy to toddlerhood, between 18 months and 3 years, is a period when the major signs of development are the increase of physical capabilities, the use of language and the ability to internalize thoughts. During this period, a child establishes walking and running, begins to explore and experiment with the environment, and increases social experiences such as talking and seeking the attention of others. Toddlers begin to develop personality and establish likes and dislikes. Play for these children is beginning to move into fantasy and parallel play, where although often in groups, toddlers play without much interaction with other children.

TODDLERS  
1½-3 YRS

(3) The preschool age child, between 3 and 6 years, has increased control of fine motor skills, a large vocabulary, and often engages in cooperative play. Fantasy play, including frequent daydreaming, occupy much time, and ambiguous and nonobjective settings and props offer varied play possibilities.

PRESCHOOL  
3YR-6YR

(4) From about 5 or 6 until 10 to 12 years of age, the school age child is passing through many intellectual, social and emotional changes. The child no longer confuses his or her own viewpoint with that of others and is able to differentiate and coordinate different points of view. The school aged child begins to engage in complex social relationships and to understand rules of games, morality and ethics.

SCHOOL AGE  
6-10YR

## 3. Range of child care programs.

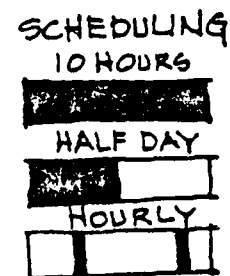
a. Air Force child care programs accept children from 6 weeks through 10 years of age. Most programs accept children whose parents are not at home before and after school hours or who wish to place children in a situation between school and family-gathering time.

### b. There are three basic scheduling patterns:

(1) Children attending for a full day, e.g., as many as 10 hours.

(2) Children attending for part of a day, typically a half day on a regular, scheduled basis.

(3) Children attending on an hourly non-scheduled basis.



c. There are three types of separation and mixing to be considered in the context of child care centers:

(1) The demands of full day, part-day, and hourly children are somewhat different and will require programs, staff, space and entries for scheduled care versus hourly care.



SEPARATION

# child care centers

G-5

(2) The need to provide somewhat separate spaces and program options for older versus younger children and also provide opportunities for overlap of different ages with the proper supervision.

OLDER

YOUNGER

(3) School age program should have a separate space with a different character from the rest of the child care operations.

4. Center size. The number of children to be accommodated in one facility is one of the more important decisions to be made when planning and programming child care centers. Maximum center size should be limited to 75 children. When a center is required to serve more than 75 children, use a modular arrangement in the design with the maximum size for each module limited to 75 children. The modules may house either one type of program or one or more programs for a variety of age groups. The modules shall be visually and acoustically separate, however, where feasible, provide proximity and interim circulation between different modules and programs. Provide for support functions such as administrative space, resource library, toy-lending library, space for itinerant staff, centralized bookkeeping, kitchen, receiving in the central core. Provide shared utility walls between modules where feasible.

75  
CHILDREN



TO MODULES

75 75

75

a. Design the child care centers, based on the following group sizes:

- (1) 0 to 75 children (small)
- (2) 76 to 150 children (medium)
- (3) 151 to 225 children (large)
- (4) 226 to 300 children (outsized)

SMALL

MEDIUM

LARGE

OUTSIZED

b. Any request to erect a center to serve more than 300 children will require special attention and shall be handled on a case by case basis.

c. The design of child care centers shall be based on 75 gross SF per child.

75 SF  
CHILD

# child care centers

G-6

## SITING

1. General. The site or sites for child care service facilities are shown on the Installation Master Plan. These sites should be reviewed relative to the following criteria, or, if sufficient sites are not shown, they should be chosen in accordance with these criteria. Major criteria include adequate size, location on the seams between housing areas, desirable proximities, and favorable features of the site as detailed below.

a. The site must be large enough to accommodate the building, outdoor playgrounds, vehicular areas and parking, setbacks and open spaces.

SIZE?

b. Locate the child care centers as near as practicable on the seams of two or more family housing areas. They also should be close to other community resources.

NEAR  
HOUSING?

c. Provide a minimum of 700 SF per child, or 0.02 acres per child for the building, playgrounds, vehicles, setbacks and open spaces.

d. The following is a list of features which can aid staff and children in utilizing the outdoors and which should be considered in selecting a site:

(1) Locate child care centers near places of natural interest to children to encourage the use of natural environment as a learning environment and for field trips (e.g., near natural areas, fields, rock outcroppings and woods.)

?  
PROXIMITIES  
?

(2) Locate child care centers near other children facilities, and consider the possibilities of sharing facilities or programs (e.g., preschools, youth activity centers, innovative play environments).

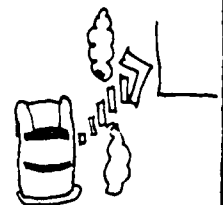
e. Avoid locating facility near the following hazards and nuisances:

- (1) Odors or smoke.
- (2) Heavy traffic.
- (3) Dust and pollution.
- (4) Security areas.
- (5) Railroads.
- (6) Aircraft runways.
- (7) Other safety hazards.

f. Site the facility so that the building:

(1) is clearly visible to cars and pedestrians coming to the facility (consider that children have smaller, lower angle of vision);

(2) is in relation to natural features so that views from the public domain will be framed, but not obstructed by trees and other elements;



GENERAL

# child care centers

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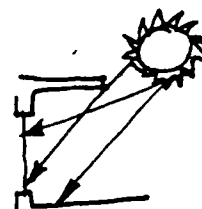
## SITING

(3) can afford viewers glimpses of outdoor play activities. However, do not create a fish-bowl out of either the outdoor yards or any indoor space;

(4) does not destroy any favorable features on the site for children, e.g., a stand of trees, a hill for climbing, rolling, winter tobogganning, or a good view of interesting nearby features;

(5) is able to capture sunny exposures in the spring and fall and so that indoor spaces will open directly onto sunny outdoor spaces, with adequate sun filtering in hot climates.

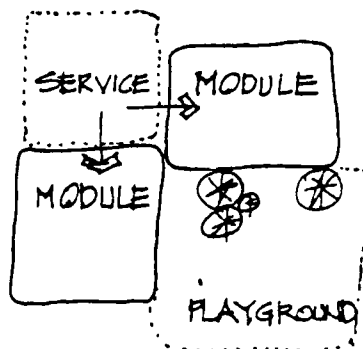
g. In colder climates, provide a sun/shade mixture in summer and full sun in winter.



Module Site Selection/Design. The following shall be considered for large installations that require one large centralized facility subdivided into semi-autonomous modules of 60-75 children each. Site modules:

1. or buildings so that each module has its own playgrounds for each age group served;

2. so that any equipment for which there is a sizable economy saving through sharing can be shared by all the modules (e.g., common delivery and service area, common kitchen).



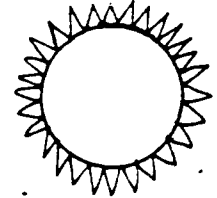
# child care centers

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## BUILDING SYSTEMS

Building Systems. The proper design and construction of building support systems, i.e., heating, cooling, ventilation, and electrical is one of the most significant ways of reducing energy consumption. The type system selected, therefore, should be based on sound economic and energy decisions.

1. Consider the use of active and passive solar systems. All facilities should have some aspects of passive solar incorporated into the design. Active solar systems should be considered for facilities with large domestic hot water consumption and air conditioning load in excess of 50 tons. It should be considered for heating when the payback period is 25 years or less.



2. Give consideration to features/systems that are known to be low energy users and have low cost operating features. Some features/systems to be considered are:

- a. Integrated heat of light - illumination systems.
- b. Water side heat pump.
- c. Multizone systems.
- d. Variable air volume systems.
- e. Night/weekend thermostat setback.
- f. Connection to base EMCS.

3. Electrical designs shall complement features that incorporate reduced energy usage. Consider a combination of general and task lighting.

RECEIVED



# child care centers

P-1

## Major Program Determinants and Options

### Proposed Decision Schedule

<u>Subject</u>	<u>Determinants</u>	<u>Options</u>
A. Scope of Project	<ul style="list-style-type: none"> <li>• Base population receiving direct installation support (AFM 86-2)</li> <li>• Waiting list</li> <li>• Special situations</li> <li>• Use of other facilities for child care</li> </ul>	<ul style="list-style-type: none"> <li>• Stay within AF criteria</li> </ul>
B. Location	<ul style="list-style-type: none"> <li>• Can housing area support a whole center considering its child population?</li> <li>• Portion of patrons coming from off-base</li> <li>• Major destination of patrons after leaving children</li> <li>• Land availability</li> <li>• Total base size</li> <li>• Staff limits</li> </ul>	<ul style="list-style-type: none"> <li>• Satellite centers in/near housing and main center in central location</li> <li>• Main center in one location (See C)</li> </ul>
C. Large Central Location	<ul style="list-style-type: none"> <li>• Climate</li> <li>• Program operation</li> </ul>	<ul style="list-style-type: none"> <li>• Separated buildings in campus plan with common facilities in one of the buildings</li> <li>• Large building with modules connected with circulation spine</li> </ul>

NOTE: There are several other decisions that must be made concerning other subjects that will affect the designer's approach such as the treatment of hourly care children, adult-child ratio, playground design approach, 24 hour care, food service, procedure, etc.

## COST ESTIMATE

A. BUILDING COST	_____ SF AT \$50.00/SF =
B. EQUIPMENT COST	(8% OF A) =
C. SITE DEVELOPMENT	(15% OF A) =
D. TOTAL CONSTRUCTION	.....
E. PLUS 10% CONTINGENCY	.....
F. TOTAL PROGRAMMED AMOUNT	.....

# child care centers

P-2

## SPACE ALLOCATION

The following are suggested minimum square footage allocations for specific areas within the facility. In certain cases maximum needs will be given. This will be clearly noted. For purposes of this chart, certain assumptions were made as to breakdown of ages of the children using this facility in order to establish square footages for the individual activity rooms. This chart is to be considered a guide only for what might be considered a typical. Each Air Force base must consider its particular individual needs and requirements in establishing the size of the center, the number and age group of children to be served. The footnotes at chart headings will give the assumed groupings by age and number of children to be served.

Center Size Room Name	Small Centers up to 75 children	Medium Centers up to 150 children	Large Centers up to 225 children	Outsize Centers up to 300 children
Interior Spaces	1	2	3	4
1. Entry/Vestible	48	65	95	130
2. Lobby	120	230	340	455
3. Reception	105	155	225	295
4. Isolation	50	50	105.5	105.5
5. Isolation Toilet	35	35	35.6	35.6
6. Director's Office	70	100	120	220
7. Staff Room	170	240	335	445
8. Staff Room Toilet <sup>7</sup>	24	55	55	80
9. Staff Closet	15	20	20	20
10. Central Storage	40	80	120	160
11. Early Infants	485 <sup>8</sup>	Provide two modules, each one totalling the size indicated in the first column.		Provide four modules, each one totalling the size indicated in the first column.
a. Food warming	[ 55]			
b. Diapering/storage	[ 20]			
c. Crawl	[175]			
d. Crib	[175]			
e. Nursing	[ 60]			
12. Infant Staff Toilet	24			
13. Older Infants	425 <sup>9</sup>	Provide three modules, each one totalling the size indicated in the first column.		Provide four modules, each one totalling the size indicated in the first column.
a. Food warming	[ 55]			
b. Diapering/storage	[ 20]			
c. Crawl	[175]			
d. Crib	[175]			
14. Infant Staff Toilet	24			
15. Toddlers	700 <sup>10</sup>			
Diapering	20			
16. Toddler Storage <sup>11</sup>	55			
17. Toddler Learning Toilet <sup>12</sup>	35			
18. Preschoolers	700 <sup>13</sup>			
19. Preschool Learning Toilet <sup>12</sup>	35			
20. Preschool Storage <sup>11</sup>	60			
21. Dining/Multipurpose <sup>14</sup>	765	1530	2295	3060
a. School age area	[325]	[1050]	[1575]	[2100]
b. Unassigned area	[130]	[ 260]	[ 390]	[ 520]
c. School age toilet	[ 50]	[ 100]	[ 150]	[ 200]
d. School age storage	[ 60]	[ 120]	[ 180]	[ 240]
22. Parent-Staff Corner	- 15			
23. Kitchen	360	100	100	100
24. Kitchen Storage	45	490	560	630
25. Laundry (Maximum Size)	80	60	80	95
26. Janitor Closet <sup>16</sup>	20	80	80	80
27. Drop-Off Zone <sup>17</sup>	700	40	60	80
Total SF/Bldg. (Typical)	4860	700	1000	1000
Circulation	670			
Other	95			
Mechanical Equipment <sup>18</sup>	140			
Total Max. Allotted SF/Bldg.	5625	8806	12814	16742

# child care centers

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## SPACE ALLOCATION

exterior

	Small Centers	Medium Centers	Large Centers	Outsize Centers
1. Playground <sup>19</sup>				
a. Infant	1000	2000	3000	4000
b. Toddler	2000	4000	6000	8000
c. Preschool	2000	4000	6000	8000
d. School-age	1500	3000	4500	6000
Totals	6500	13000	19500	26000
2. Playground Storage <sup>20</sup>				
3. Parking Spaces				
a. Visitors/parents	7	13	19	25
b. Staff	8	14	21	27
c. Short term	10	15	23	30
Total Spaces	25	42	63	82

<sup>1</sup>This size is geared for 20 infants (10 early, 10 older), 20 toddlers, 20 preschoolers and 15 school aged children.

<sup>2</sup>This size is geared for 40 infants (20 early, 20 older), 40 toddlers, 40 preschoolers and 30 school aged children.

<sup>3</sup>This size is geared for 60 infants (30 early, 30 older), 60 toddlers, 60 preschoolers and 45 school aged children.

<sup>4</sup>This size is geared for 80 infants (40 early, 40 older), 80 toddlers, 80 preschoolers and 60 school aged children.

<sup>5</sup>Provide two separate rooms.

<sup>6</sup>Isolation toilet shall be shared wherever possible. If not possible, then provide two separate isolation toilets.

<sup>7</sup>Combine this space with school age toilets.

<sup>8</sup>Based on 10 infants.

<sup>9</sup>Based on 10 infants.

<sup>10</sup>Based on 20 toddlers.

<sup>11</sup>See Appendix E.

<sup>12</sup>Combine toddler and preschool into one toilet room per 75 child module.

<sup>13</sup>Based on 20 preschoolers.

<sup>14</sup>For larger centers, one dining room is preferred, however, if necessary, two rooms may be provided.

<sup>15</sup>In this size center, combine space with staff lounge.

<sup>16</sup>Provide one closet per two modules.

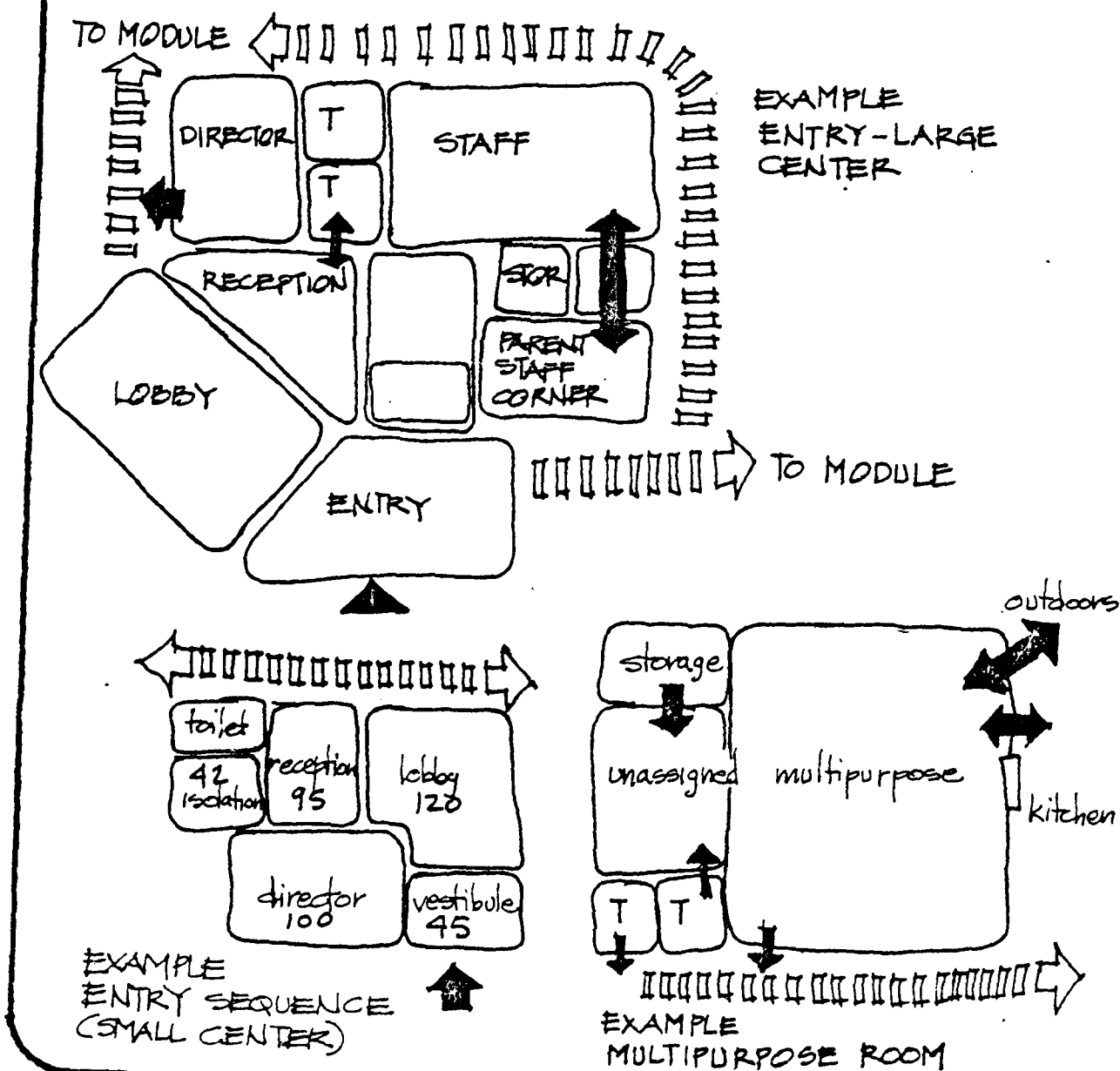
<sup>17</sup>Area for this space counts as 50% of actual room square footage.

<sup>18</sup>This space does not count towards the building gross square footage.

<sup>19</sup>This represents total minimum space to be provided. The number of individual areas is left to the designer's discretion.

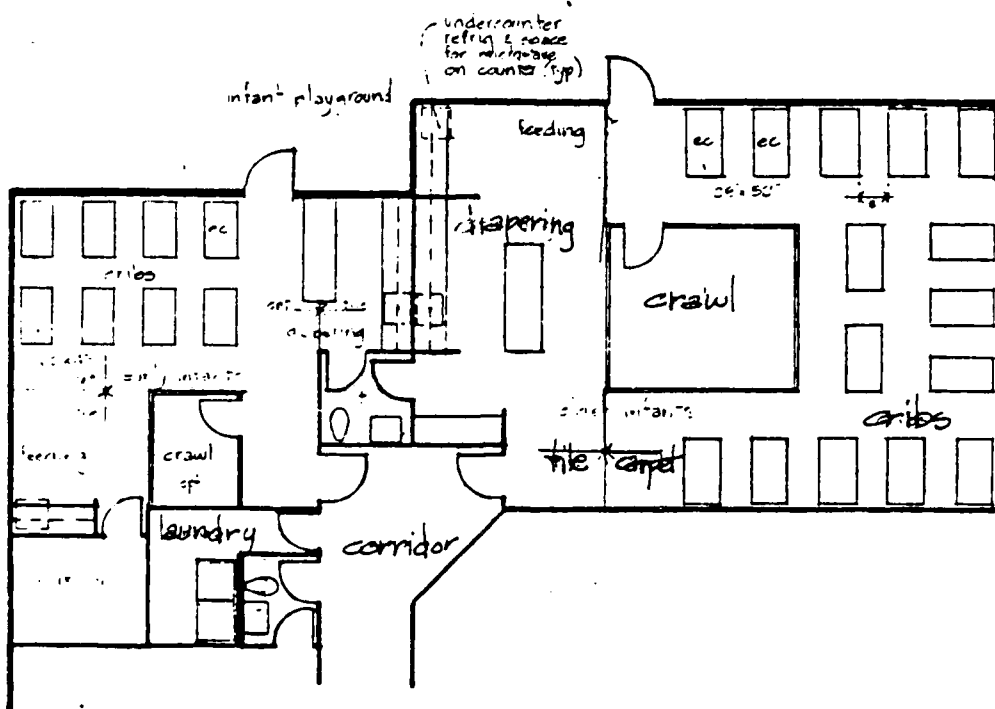
# child care centers

P-4

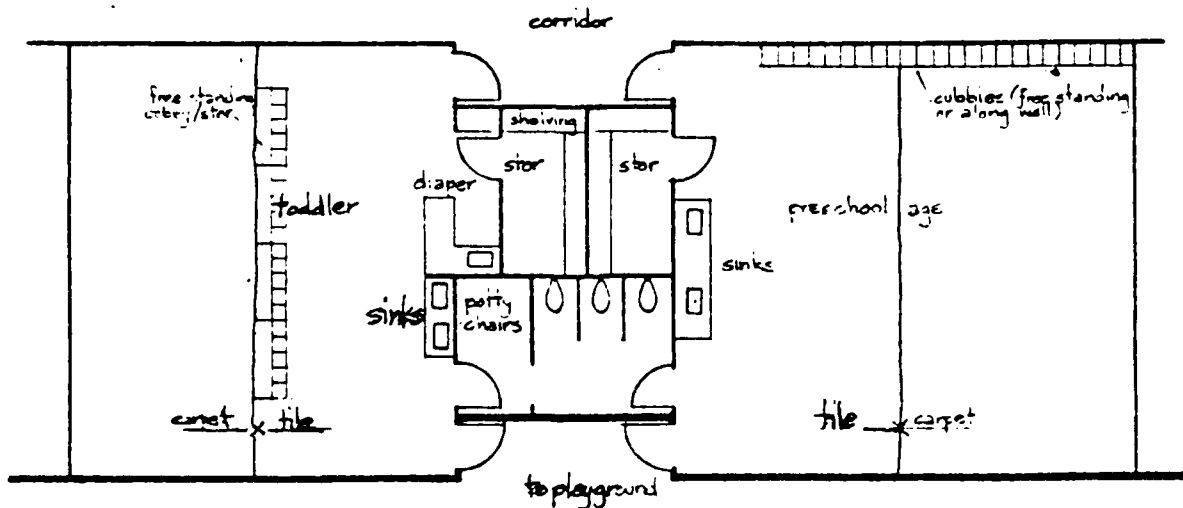


# child care centers

P-5



EXAMPLE  
Early/Older Infants  
Activity Area

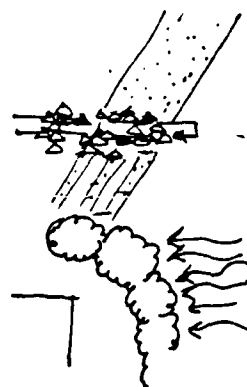


EXAMPLE  
Toddler/Preschool age Layout

PROGRAMMING

## ENERGY CONSERVATION

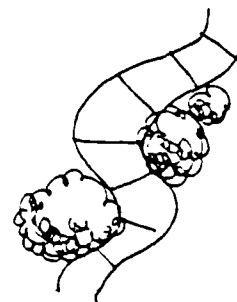
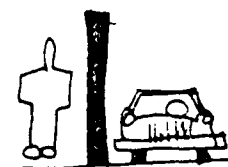
1. Use landscaping, earth berms, etc., where appropriate.
2. Orient the facility to take advantage of or decrease the impact of the following characteristics:
  - a. Sun angles and average number of sunny days per season.
  - b. Wind directions and velocities per season.
  - c. Precipitation amounts per season.
  - d. Shadow lines from adjacent buildings.
  - e. Wind buffers (orient with a closed side facing winter winds and an open side facing cooling summer breezes).
3. In temperate and cold climates, use deciduous trees (rather than evergreens) within the outdoor play area and near the building; they will provide shade in summer and will not block the sun in winter. Use areas of partial shade as appropriate. They should only be dominant in hot and humid climates and should be used in conjunction with shade and natural ventilation.
4. Consider the use of trees, shrubs, and grass to provide significant cooling through evaporation.
5. Vine coverings on walls and trellises can serve as temperature control devices and can help control daylighting intensities.
6. Use earthforms, dense evergreens, and existing building as windbreaks on the side of the outdoor area facing prevailing winds.
7. In colder regions, use windbreaks to trap snow and prevent build-up on the roads and walks of the site. Windbreaks or shelter belts are most effective when placed perpendicular to prevailing winds.



## PARKING AND WALKS

Provide safe points of facility access for children and adults which are separate from automobile circulation. Design drives and walks which preserve and utilize the natural landscape.

1. Walks:
  - a. Provide a sheltered walkway leading directly from the drop-off point to the building.
  - b. Connect the building to the public sidewalk system, to parking, and to the covered drop-off porte cochere with pedestrian walks. Minimum width should be 4 feet.
  - c. Create interesting pathways which meander and curve, which go through natural areas wherever possible, and which overlook interesting sights including the playgrounds.



# child care centers

S-2

## 2. Parking:

a. Analyze the parking areas and access roads carefully during the design process to prevent them from becoming a major focal point of the facility. Share parking with others where practical.

b. The drop-off point for cars or buses should be close to the entrance.

c. Locate parking for parents, staff, and visitors near the building with a view to the entry. Separate and visually screen vehicular access, service areas and parking from the play areas.

d. Provide a service vehicle apron.

e. Provide bus access if applicable.

f. Allow between 150 and 200 SF/car for circulation in parking areas and drives plus an additional 660 SF minimum for the drop-off and porte cochere.

g. Two-way approach drives should be 20 feet wide, single lanes require 12 feet in width.

h. Allow minimum of 200 SF per car for parking only and 396 SF per car for parking and drives.

i. Provide one parent/visitor space per 12 children, handicapped spaces in accordance with ANSI criteria and one staff space per 1.25 staff.

j. Provide short term/drop-off parking spaces (5 minutes) duration, based on 1 space per 20 children.

## 3. Roadways:

a. Provide adequate lighting for all roads; lighting is required for the approach drive and parking areas.

b. Four basic functions require service access to a typical child care facility. Regular food deliveries to the storage and kitchen area; occasional supply deliveries (furniture, laundry, books, toys, etc.); mechanical room-related deliveries (fuel, maintenance equipment); and garbage pickup. The following should be provided:

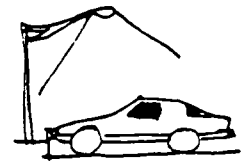
(1) Service access area should accommodate a large truck (delivery van size).

(2) A back-up spur should be provided for dead-end and service drives which exceed 100 feet in length.

(3) Access should be close to the serviced areas; i.e., kitchen, garbage storage (either indoor or outdoor), mechanical room, and service entry, if one is designated.

d. Screen the service area from public use areas with fences, depressions, plants, shrubs, trees and berms. Provide physical barriers to separate outdoor child care areas from all service areas.

e. Avoid service access through playgrounds.



# child care centers

A-1

## PURPOSE

Purpose. The primary purpose of child care centers is to serve the developmental needs of children of different ages and cultural backgrounds, and this must be the dominant objective of their architecture.

## USERS

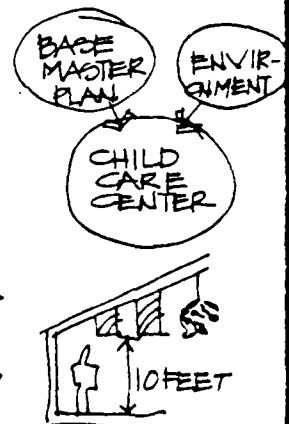
Users. The primary users of the child care centers are:

1. Children:
  - a. Early infants (6 weeks to 6 months).
  - b. Older infants (6 to 18 months).
  - c. Toddlers (18 to 36 months).
  - d. Preschool age (3 to 6 years).
  - e. School age (6 to 11 years).
2. Staff:
  - a. Director.
  - b. Desk clerk/receptionist.
  - c. Program director/assistant director.
  - d. Caregivers.
  - e. Food service workers.
  - f. Maintenance.

## GENERAL DESIGN CRITERIA

### Architectural style and scale

- a. Design the child care center using an architectural style, choice of materials and color selections that are compatible with the base master plan and the adjacent environment.
- b. Design the facility to reflect a residential character by using residential scale doors, windows, roof forms, landscaping and pathways.
- c. Keep the ceilings in the activity areas at approximately 10 feet high. If sloped roof shapes are used without dropped ceilings, consider using exposed trusses with the bottom chords held at 10 feet, or banners flags, panels, hanging plants, etc., to create an impression of a 10 feet high space. Hold the ceilings in other areas to 8 or 9 feet high.
- d. Use child-scaled materials and equipment whenever possible in the activity areas, toilets and other areas frequented by the children. These child-scaled elements include plumbing fixtures, mirrors, windows, drinking fountains, cubbies, furniture, chalk and bulletin boards, etc. If adult-sized equipment is provided which must be used by the children, make provisions to accommodate this use.

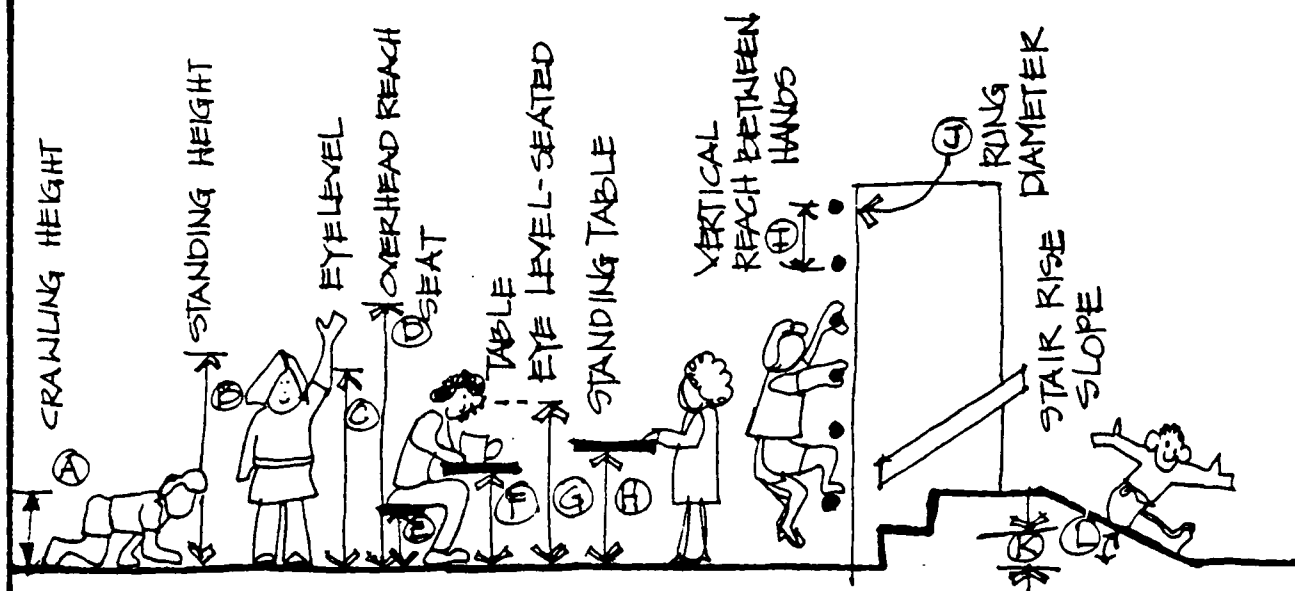




# child care centers

A-2

## DIMENSIONS FOR CHILD-SCALE



### CHILDREN'S DIMENSIONS (IN INCHES)

	INFANTS (1yr)	TODDLERS (2yrs)	PRESCHOOL AGE (4yrs)	SCHOOL AGE (6yrs)	(10yrs)
A) CRAWLING HEIGHT.....	13 3/4	16	19 1/2	21 1/2	24 1/2
B) STANDING HEIGHT.....	29	33 3/4	41	46	54
C) EYE LEVEL.....	26	20 1/2	38	41	48 3/4
D) OVERHEAD REACH.....	38	44	49 1/2	53 1/2	65
E) SEAT HEIGHT.....	26	7 1/2	10	11	15
F) TABLE HEIGHT (SEATED).....	27 (a)	14	16	18 1/2	23
G) EYE LEVEL (SEATED).....	21	25	29	34	37
H) TABLE HEIGHT (STANDING)...	-	17	20	24	29
I) VERTICAL REACH BETWEEN HANDS.....	-	11 1/2	16 1/2	24 1/2	28
J) RUNG DIAMETER.....	-	1 1/2	1 1/2	1 3/4	2
K) STAIR RISE.....	1-3	3	4	5	6
L) SLOPE.....	14°	14°	19°	25°	25°

(a) INFANT FEEDING CHAIR HEIGHT

(\*) NO LOOSE ITEMS IN INFANT AREAS SHOULD BE LESS THAN  
1 1/2 INCHES IN DIAMETER

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# child care centers

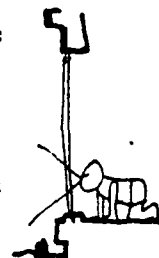
A-3

## Energy Conservation

Facilities should be designed, constructed and operated to conserve energy resources to the fullest extent possible, while providing developmentally-appropriate environments for children. Use energy conserving techniques for both site development and building design. Consider solar orientation, building compactness, and passive conservation measures as well as active measures as appropriate for each individual project.

### Building Envelope.

1. Design all walls to conform to Air Force criteria for "U" values.
2. Provide minimum sized windows. Current window/wall ratio criteria shall be used to determine amount of windows and appropriate sizes. (Use of windows shall depend on prevailing climate conditions.) (Fixed glass should extend as close to floor as possible.)
3. Use overhangs, vestibules, angles, and shading devices in the design where applicable to reduce energy usage.



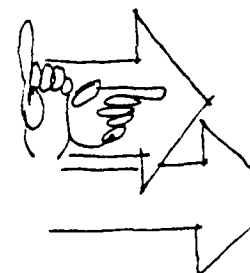
## Design for the Physically Handicapped

1. All child care centers shall be designed to be barrier-free and accessible to the physically handicapped in accordance with DOD and ANSI criteria.
2. Design the site and the building to permit the physically handicapped persons to act independently and pursue opportunities normally afforded able-bodied persons.
3. Minimize environmental barriers for handicapped children and staff by making movement easy and barrier-free, by locating objects within reach, and by designing the environment to be easily "read."
4. If there are requirements to accommodate severely physically handicapped children into the child care program, contact the Manpower and Personnel Center (HQ AFMPC/MPCSXC) for additional criteria.



## Circulation Design

- a. Design the circulation paths to be clear to the children, staff and parents. Use colors, textures and finish materials on the walls and/or floors to define traffic patterns. Use signs with words and symbols where appropriate.
- b. All circulation paths shall be a minimum of 3 feet in width and shall comply with the fire exit width requirements.
- c. Calculate the amount of nonassignable space (interior circulation and interior and exterior walls) based on a minimum of 20% of the net assignable space (primary and secondary activity areas, staff, service and 50% of the overhangs at the entry, indoor activity areas, etc.).



ADDITIONAL

# child care centers

A-4

## Acoustics

a. Zone quiet activity spaces away from noisy activity areas. Provide an environment which permits sound control.

b. Examine noise relationships between activity areas and provide appropriate acoustic protection where needed. Sounds can be used to heighten interest in activities and to relate activities to space, e.g., a quiet space for resting, an acoustically alive space for physical activity. Certain sounds are comforting and interesting to children while others produce irritation, distraction and fatigue.

NOISY  
NOISY  
QUIET

(1) The anticipated peak noise level in child care centers is 70-80 dbA. The preferred sound criteria (PNC) should be 35-45 dbA in primary and secondary spaces, less in napping spaces.

(2) Limit the ambient noise level from mechanical systems, outside noises and adjacent spaces to 30-40 dbA.

(3) Limit the reverberation time to 0.6-0.8 seconds generally. Provide less in smaller spaces.

## Construction/Material Selection

1. Consider the initial cost of construction and the cost of operation, maintenance and custodial care projected over a 25-year life cycle when evaluating building system alternatives during the design development process. Provide an economic analysis for all major building components (foundations, structure, electrical, mechanical, finishes, etc.), and evaluate at least three alternatives when material or system options are available.

2. Select easy maintenance materials to help keep the building looking bright and "new." Finish all interior walls, doors and trim with easily cleaned surfaces such as gloss or semi-gloss epoxy or enamel; consider using darker colors on doors and jambs to mask fingerprints, etc.

3. Hardware. Children will experiment with latches and other hardware in their explorations of the facility. Hardware shall not have sharp edges or protrusions. Consider safety in the selection and placement of hardware.

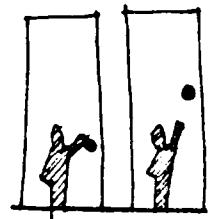
a. In areas where children should not have access, place locks and bolts out of children's reach.

b. Use hardware for children and adults that is operable from either side and non-locking to prevent small children from getting locked inside a space.

c. If dutch doors are used, the bottom portion may be locked.

4. The use of accordion doors shall not be encouraged during the design process.

MAINTENANCE



# child care centers

A-5

## Fire Protection

### General:

1. When a facility or open space houses more than one age group, the fire protection requirements for the younger children shall apply.
2. Except as noted herein, the requirements of NFPA 101, Life Safety Code (latest edition) apply.
3. Locate all child care facilities on the ground floor regardless of building construction. Separate spaces for school age children may be above the ground level if special construction standards or automatic fire suppression systems are included.
4. Occupant load is based on 35 square feet of net floor area per person.
5. All child care centers shall be of Type N construction.

TYPE "N"  
CONSTRUCTION

### Fire Area Separation.

1. Hazard areas shall be separated from the rest of the building by one hour fire rated walls. Walls separating different age groups shall be fire rated for one hour.
2. All doors in fire rated walls shall be self-closing and equipped with automatic hold open devices. Any actuation of the buildings' fire alarm system shall cause all doors to close.
3. Compartmented sleeping areas are required for multi-story centers or centers located above the first floor.
4. Smoke divisions are required at 300 feet intervals.

### Exit Criteria.

1. Provide at least two fire exits from each activity space. One of these exits shall discharge directly to the outside and shall not require travel through any other area to reach the exit discharge. In crib rooms, both exits shall discharge directly to the outside.
2. Circulation paths used as fire exit paths shall be a minimum of four feet wide.
3. Travel distance to exits in modified open plan centers for children three years of age and older shall not exceed 150 feet.
4. Exits from crib rooms shall be sufficient width to accommodate a crib. Hold-open devices are required on these doors. Exits opening above ground level require ramps; these ramps shall be limited to a maximum slope of one foot in 20 feet. Ramps shall not be less in width than the exit door leading to the ramp. Ramps shall have non-slip surface. Ramps exceeding one foot in height at any point shall have guard rails. Ramps shall have a maximum 30 feet run to landings.

OUTSIDE



# child care centers

A-6

## INTERIOR DESIGN REQUIREMENTS

1. Use comprehensive interior design services for child care centers. These services may be provided by one of the MWR and transient billeting interior design staffs at HQ AFMPC or several MAJCOMs.
2. The interior design staff will work with the building designer in selecting and coordinating structurally related items, i.e., wall finishes, carpet, etc. Additionally, the interior design staff will recommend furnishings. The furnishings recommended will be from appropriate GSA or NAP sources dependent upon type of funds.

### Interior Design Techniques

1. Perception of color dominates from early childhood, and color is a strong visual cue. To be effective, color cues must be at least partially appropriate to children's levels of perception. Large expanses of very vivid colors are not appropriate. Rather, use smaller areas of bright color to highlight areas.
2. Emphasize expected activity levels or highlight a high-use object by using bright, vivid colors appropriate to the activity: red-orange-yellow hues for very active areas; blue-green-purple shades for more quiet areas.
3. Choose neutral colors for large background areas and walls used for display.
4. Textures help cue children in activity areas. Soft textures help children to feel relaxed and quiet, while harder finishes and surfaces make a space noisier and livelier. Floor textures can be used to emphasize activity space boundaries since children spend so much time on the floor.
5. Where appropriate, use color-texture graphics on the floor and on the walls below 3 feet.
6. Leave some walls or the structural members semifinished to encourage staff and children to paint them themselves, and to be able to attach partitions or props against them.
7. The use of lead-based paint is prohibited in child care facilities. In renovated facilities, test existing paint for lead content (either by direct read-out instrumentation or by chemical analysis of samples). If lead paint is found, remove it.

~~LEAD BASED  
PAINT~~

### Interior Finishes

1. Interior finishing materials shall be class A only. All materials shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less (ASTM E-84 Test).
2. Carpet shall comply with the requirements of AFM 88-15. Carpet used in the vertical position shall be considered as interior finishing material and shall meet the requirements of E1 above. Carpets shall comply with fire resistance requirements.
3. Special protective electrical receptacle covers shall be installed in all areas occupied by children under 5 years of age.

ADULTS ONLY

# child care centers

A-7

## Furnishings

1. Select the furnishings in a child care facility for their flexibility, variety, safety, sturdiness and anthropometric suitability. Use the furnishings to define activity spaces and circulation paths. See page A-2.

a. Use furnishings and movable partitions which have many uses and can be easily moved by staff to help define activity areas (e.g., storage units, display space, puppet stages, etc.).

b. Size the furnishings to be comfortable for the designated age group.

c. Select furnishings that do not have sharp corners or edges, will not splinter, do not have toxic surfaces, or cannot be easily tipped over.

d. Make floor level changes by means of movable platforms rather than by actual level changes in the floor construction.

2. Establish furniture and equipment needs for each space. Estimate costs for free-standing furniture and equipment based on the GSA Federal Supply Schedules, Federal Prison Industries Schedule, and the general GSA Supply Catalogue. These sources are mandatory insofar as they meet requirements, and cost estimates should be based on prices therein, escalated to time of actual procurement. Certain products used by child care centers are not available through normal mandatory services. These should be obtained on the open market.

3. The following are typical furniture items:

- a. desks, chairs, tables;
- b. storage units, including movable storage units;
- c. low, movable dividers;
- d. audio-visual equipment;
- e. bookshelves, racks, and open storage;
- f. cots, mats and cribs;
- g. infant changing tables;
- h. sand and water tables, easels, etc.;
- i. kitchen equipment;
- j. nature and science equipment;
- k. rugs, cushions, bean bags, stuffed chairs; and
- l. outdoor play equipment.

# child care centers

A-8

FUNCTIONAL  
AREA

LISTING OF  
ALL AREAS

SMALL  
MEDIUM  
LARGE  
OUTSIZED

INTERIOR SPACES

- ENTRY/VESTIBULE .....
- LOBBY .....
- RECEPTION .....
- ISOLATION • TOILET .....
- DIRECTOR'S OFFICE .....
- STAFF ROOM .....
- STAFF TOILET .....
- STAFF CLOSET .....
- CENTRAL STORAGE .....
- ACTIVITY AREAS (GENERAL) .....
- EARLY INFANT ACTIVITY AREA .....
- OLDER INFANT ACTIVITY AREA .....
- INFANT STAFF TOILET .....
- TODDLER ACTIVITY AREA .....
- LEARNING TOILET .....
- PRESCHOOL ACTIVITY AREA .....
- DINING / MULTIPURPOSE .....
- PARENT - STAFF CORNER .....
- KITCHEN .....
- LAUNDRY .....
- JANITOR CLOSET .....
- MECHANICAL ROOM .....
- CIRCULATION .....

TOTAL MAXIMUM ALLOTTED .....

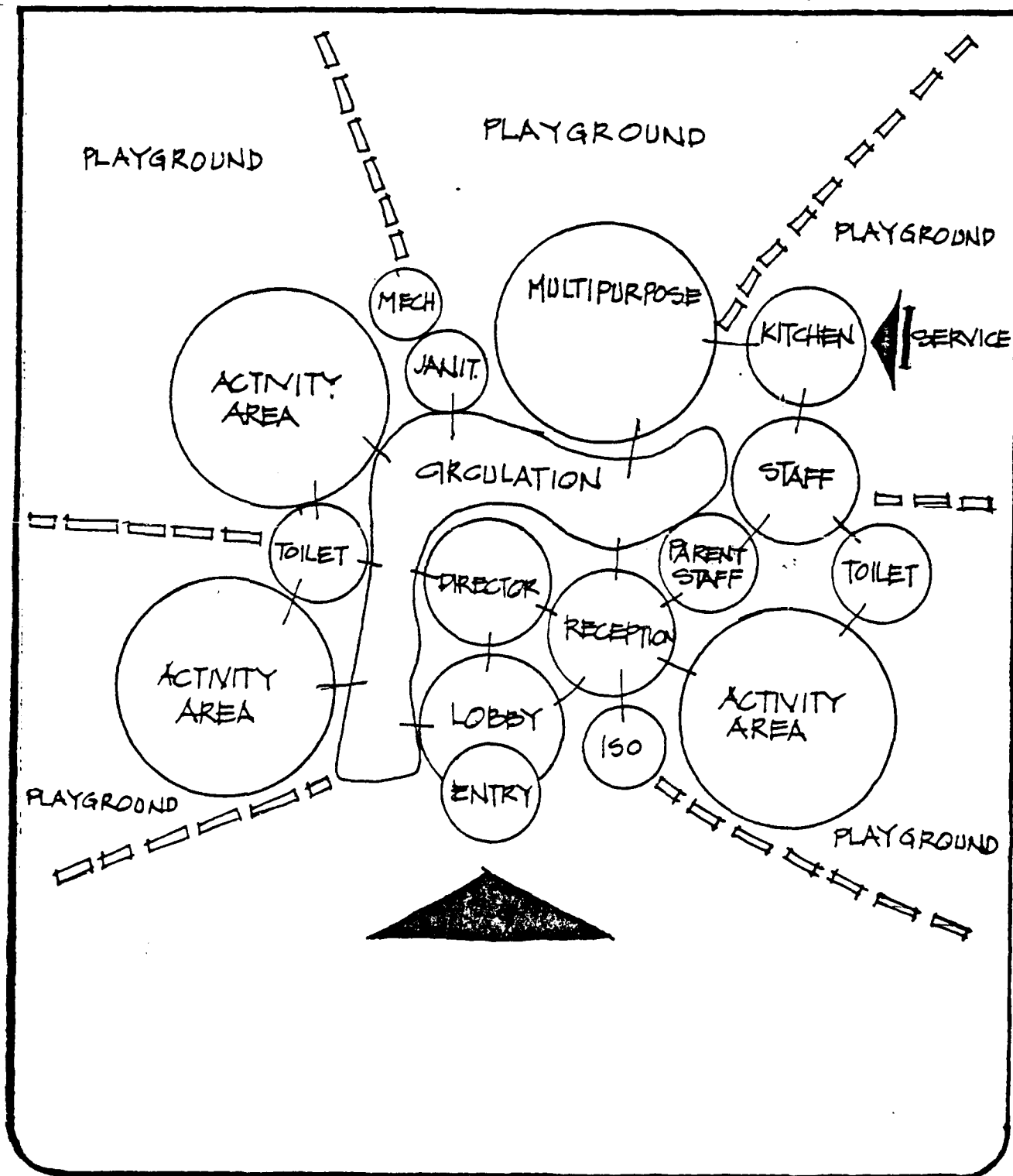
EXTERIOR SPACES

- INFANT PLAYGROUND .....
- TODDLER PLAYGROUND .....
- PRESCHOOL PLAYGROUND .....
- SCHOOL-AGE PLAYGROUND .....
- PARKING SPACES .....

ARCHITECTURE

## A-9

## BUBBLE DIAGRAM





A-10

Entry/Vestibule	4
Lobby	5
Reception	4
Isolation	4
Isolation toilet	3
Director office	3
Staff room	4
Staff room closet	3
Staff toilet	3
Central storage	3
Early infant room	3
- food warming	1
- diapering/storage	3
- crawl	3
- cribs	3
- nursing	3
Infant staff toilet	4
Infant room	3
- food warming	1
- diapering	3
- crawl	3
- staff toilet	3
Toddler room	4
Toddler storage	4
Toddler learning toilet	3
- diapering	3
- play/nap	3
Preschool age room	4
Preschool toilets	4
Preschool storage	3
Laundry/janitor closet	4
Kitchen	4
Kitchen storage	3
Dining/multipurpose	4
School age	4
School age toilet	4
School age storage	3
Outdoor infant area	3
Toddler playground	3
Preschooler playground	3
School age playground	3
Mechanical	4
Service drive	4
Drop-off zone	4
Playground storage	4

6 - Must be shared where feasible  
5 - May share same space in small cen  
4 - Must be next to each other with d

- 6 - Must be shared where feasible  
5 - May share same space in small centers  
4 - Must be next to each other with direct access  
3 - Should be in close proximity  
(Blank) - Proximity not critical  
1 - Should be separated by distance  
0 - Walls or fence separate

# ADCIITESCITUDAL

# child care centers

A-11

## FUNCTIONAL AREA

Entry.....  
Lobby.....  
Reception.....


### Requirement

**Entry/Vestible.** Provide an entrance vestibule for weather protection. Provide two sets of outward swinging double doors with closers and panic hardware.

a. Make the entrance to the building obvious to first time users through the use of signs, overhangs, gates, paths, planting and colors.

b. Provide a covered entryway large enough to serve as an outdoor waiting area. In appropriate climates, extend this roofed area sufficiently to offer protection for two to four cars parked for a few minutes by parents picking up or delivering their children. Provide a minimum of 300 SF for this extended covered space. In calculating the gross footage of the child care center, calculate this area at 50%.

c. Provide views of the interior and outdoor activity areas for the approaching children and parents whenever possible. The design shall be such that children will not have to walk through traffic.

d. Design the pedestrian approach to the building so that the pathway does not pass through any outdoor activity areas. This does not apply to separate front yard or front porch play areas where children can play with their parents upon pickup or delivery.

e. Use elements such as carpeting, warm colors, low level lighting and soft, residential style furniture to provide an inviting and reassuring reception for the children.

f. Design the entry and reception area to permit the parents to meet or say good-bye to their children, help them with their clothes and deliver them to their assigned areas without disruption of the child care center operations.

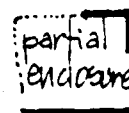
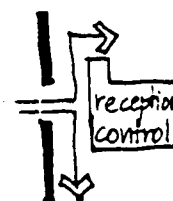
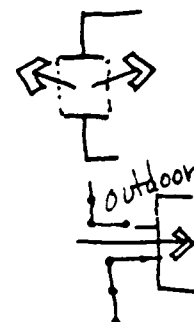
g. Design the entry to provide the receptionist with a clearly visible, controlled access point.

**Lobby.** Lobby should be an informal, friendly and home-like area adjacent to the vestibule and reception area. For purposes of control, all child care center activities shall be channeled through this area.

**Reception.** Provide a reception area adjacent to the lobby. Design the area to convey a sense of partial enclosure, warmth and protection.

a. Provide a receptionist counter/desk to accommodate a cash register or cash drawer, telephone and reception-secretarial-bookkeeping files and equipment.

b. Provide for a waiting area for the parents with seating, a coat closet, access to a toilet and space for a pay telephone. (Pay telephone space shall be adequate to accommodate handicapped requirements.) (This space shall be located in the lobby.)



ARCHITECTURAL

# child care centers

A-12

## FUNCTIONAL AREA

Director's office.....  
Staff room.....  
Parent/staff corner.....

**Manager/director's office.** Provide a manager/director's office with closet. The director's office and related administrative areas should be visible and accessible to children and parents, provide visual access to the entry area, and maintain visual contact and access to main activity areas.

a. In addition to normal administrative work, the director needs to be readily accessible to staff, children and parents; to have access to indoor and outdoor child activity areas; and to meet with groups of staff, parents and consultants. Design the office to provide for complete visual and acoustical privacy when required.

b. Provide a window and natural ventilation, if possible.

**Staff.** Provide a staff lounge/workroom that is comfortable and buffered visually and acoustically from the activity areas. A staff/public toilet should be nearby.

a. Provide a closet with a hanging rod and shelf for staff garments.

b. Provide 16-24 cubic feet of secured storage for valuables.

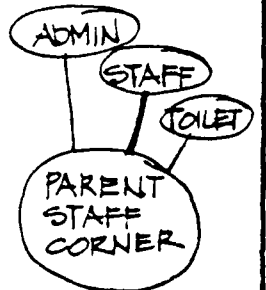
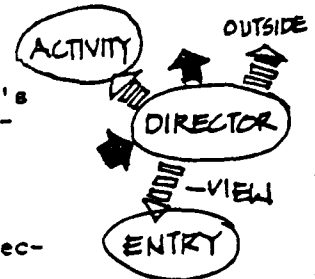
c. Provide standard height work counter, storage for equipment (duplicator, typewriter, etc.) and shelving for books and journals. Provide a tackboard for notices.

d. Provide a window and natural ventilation, if possible.

**Parent-staff corner.** Provide a parent-staff area to accommodate five to seven seated adults. Locate this area adjacent to the administrative area, the staff room and the public toilets.

a. In small centers with a maximum of 75 children, the staff room shall be used for this function.

b. In the larger centers, provide a separate area of approximately 100 SF.



ARCHITECTURAL

# child care centers

A-13

## FUNCTIONAL AREA

## Activity areas -general

### Activity area design:

a. Provide for both small and large group activity pockets within each age group activity area. Design these activity pockets so that they are open enough to permit children to see the variety of play possibilities available to them, yet provide enough closure to protect the child from noises and visual distractions.

b. Design the activity areas to encourage small group interaction. Provide nooks for two through five children. The maximum size group and the number of staff required for supervision are shown below for the various age groups.

Group	Maximum Size of Group	Staff Required
Early infants (6 wk-6 mo.)	8	2
Older infants (6-18 mo.)	16	2
Toddlers (18-36 mo.)	20	2
Preschool age (3-6 yr.)	24	2
School age (6-11 yr.)	30	2

c. Minimize the number of children to which an individual child is exposed to reduce the spread of disease. The different age groups should not be combined for play activities except in the outdoor play areas or in areas where a minimum of 75 net SF per child is provided.

d. Provide adequate display spaces for children's artwork, bulletin boards, chalkboards and other writing surfaces at children's eye level heights, i.e., 20 to 34 inches high.

e. Use walls for storage and display and to provide visual and tactile stimulation through the use of colors and textures. Half height walls can be used to provide spaces for climbing, seating, plants, puppet stages, etc. Consider the use of glass walls where acoustical but not visual separation is required.

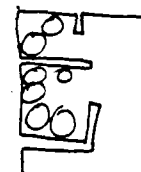
f. Use graphics, murals, display surfaces and shelves to scale walls without textures down to the child scale.

g. Design the floors to be free of drafts and warm to the touch.

h. Select floor finishes that are appropriate for the specific activity pockets, i.e., hard surfaces for wheel toy play, etc. Choose finishes that resist moisture and minimize maintenance. Use hard surfaces under areas used for eating, painting, water play, etc.

i. Select soft floor coverings which are impervious to bacteria and fungus growth and odor retention.

j. Provide as many soft things in the environment as possible, i.e., floor cushions, carpet, soft furniture, etc.



A-14

## Activity pockets

# child care centers

A-15

## FUNCTIONAL AREA Activity pockets (cont'd)

### 3. private places

Provide protected, private places where children can retreat or break-away from activities and observe other children. Include alternative exits from any activities which may be too challenging for some children. All retreat and observation points should be child-scaled, partially protected from other activities, and yet have easy viewing access to other activities. Consider small window seats, platforms, cubby-holes, nests, spaces under ladders, or stairs, etc.



### 4. release area

Provide spaces for children to express and release emotional anxieties, such as anger, tension, or frustration with themselves, others, or the environment, or just to withdraw and cool off.

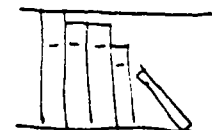
- Provide secluded areas sheltered from sensory overload.
- Provide soft areas where children can kick and punch away any violent aggressions.
- Provide a place for building where children can become involved in building, tearing down and rebuilding.
- All time-out and emotional release areas shall double function so that they would not become stigmatized with behavioral problems, i.e., "The room for bad children ...."
- Provide active and passive color schemes: earthy reds and ochres are conducive to high activity; yellows are bright and cheery; light blues and grays are quieting and soothing.



### 5. reading/listening area

A reading and listening area should be provided in each room for children two and over. It should be an intimate, quiet and comfortable space, offering a variety of sitting and reclining positions for individual and small group reading. Furnishing should accommodate storage and display of books and materials accessible to children. Lighting should reflect a home atmosphere with well shielded incandescent lamps.

- Provide general ambient lighting at 30 fc., and task lighting on resources and special reading areas at 50 fc. Light level controls are desirable.
- Sound insulation is necessary. Carpet the area. Ambient noise should be a maximum of 30 dbA. Reverberation time should be a maximum of 0.6 seconds. Reduce internal noise to a Preferred Noise Criteria (PNC) of 35 dbA.
- Provide storage and display space for reading materials at child height. The reading area requires sufficient display space for showing the front covers of 20 to 25 books.



ARCHITECTURE

# child care centers

A-16

## FUNCTIONAL AREA

### Activity pockets (cont'd)

#### 6. dramatic play area

Provide a dramatic play or imaginative area of 48 SF minimum non-objective setting for toddlers (minimum 3 SF/child) and 60 SF minimum setting for preschoolers.

a. Locate these pockets in a relatively quiet zone away from major circulation and concentrations of adults, but near the music area.

b. Consider a two-level dramatic play area, one level shall be objective, and the other level non-objective.

c. Provide a variety of ambiguously shaped spaces, e.g., spaces which can be interpreted by the child or by a group of children in a variety of evocative ways. Don't emphasize, therefore, spaces which can only be interpreted in one way, e.g., a "castle," a "boat," a "crow's nest," etc.

d. Consider building play frames with sliding panels.

e. Provide natural daylight. A view out is optional.

f. Provide 30 cubic feet of storage for props and play items at child height.

#### 7. music center

Provide a music center with seating for four to five children, storage for musical instruments, and carpeting.

a. Provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler) and a minimum of 60 SF for preschoolers (minimum 3 SF/preschooler).

b. Provide a minimum 65 SF for school age children (minimum 4 SF/child).

c. Locate the music center away from major circulation paths, but close to compatible areas such as flexible motor activities area which might be expanded to accommodate combined music-dance activities.

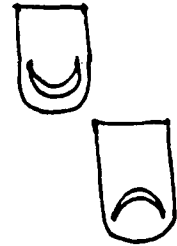
d. Provide task lighting where appropriate, e.g., over piano, highlighting instrument storage, etc., and general lighting at standard levels.

e. A view out is optional.

f. Provide three child-proof 115-120V electrical outlets.

g. Additional acoustical insulation or separation should be provided if a piano is utilized.

h. Allow about 40 cubic feet of storage.



# child care centers

A-17

## FUNCTIONAL AREA

### Activity pockets (cont'd)

i. Provide child accessible storage for instruments, music and electronic equipment (phonographs, headsets). It should be child-accessible. An equal amount of teacher-only storage should be provided for musical instruments and materials not to be used at will by children, segregated by height and in a variety of shapes and sizes to accommodate items.

### 8. audio-visual area

Provide an acoustically buffered area for five to twenty children which is easy to darken for using audio-visual aids. Double-function this area with the music nook where appropriate.

- a. In large module-plan centers, provide a minimum 200 SF space for all age groups to share.
- b. Locate near a central resources storage area.
- c. Provide an antenna or cable hook-up for TV and video tape player.
- d. Provide task lighting. Lighting levels in this area should have controls to provide a range of darkness.
- e. Provide a screen or a white wall.

### 9. arts/crafts area

Provide a separate arts and crafts center for the following groups in the quantities indicated:

- a. Provide a minimum 48 SF for toddlers (minimum 3 SF/toddler).
- b. Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschoolers).
- c. Provide a minimum 100 SF for school age children (minimum 7 SF/school age child).
- d. Provide natural light and a view out.
- e. Provide a two child-safety 115-120V electrical outlets.
- f. Provide sink with hot and cold water and counter space.
- g. Provide floor and wall surfaces impervious to clay, paint, etc.
- h. Provide storage for supplies, unfinished work (both 2- and 3-dimensional), and drying racks.
- i. Provide display space: tackboard and shelves.

ARCHITECTURAL



# child care centers

A-18

## FUNCTIONAL AREA : Activity pockets (cont'd)

j. Provide space for double easels and both horizontal and vertical work surfaces for drawing and construction.

### 10. game/toy area

Provide a games and manipulative toy play area to meet the following criteria.

a. For infants, provide a minimum 30 SF area for toys (minimum 3 SF/infant). It can be an area where toys can be hung or taken from low shelves, a surface adequate for push-pull toys, and ample storage.

b. For toddlers, provide a minimum 36 SF area (minimum 2.25 SF/toddler). Provide a variety of floor surfaces as well as table tops for playing games, puzzles and small manipulables.

c. For preschoolers, provide a minimum 60 SF area (minimum 3 SF/child), to accommodate a variety of games and activities such as puzzles, peg boards, felt boards, manipulative activities, etc. Include plenty of table and floor space for both individuals and small groups.

d. Provide a semi-enclosed space that is protected from loud boisterous activities, yet allows for adult supervision.

e. Design for peak noise levels up to 80 dbA, but reduce generated and ambient noise to 40 dbA. Use sound absorbers wherever possible to help reduce noise levels, e.g., a firm carpet, soft wall hangings, cork display boards, etc.

f. Provide general ambient lighting at 50 fc with multi-level switching to allow flexibility.

g. Provide a minimum of 20 cubic feet of easy-to-reach dispersed block storage. Use materials carts or storage units on wheels as dividers.

### 11. block play area

Provide block play accommodated in small areas where one to four children can play with small blocks, and in an adjacent, larger, multipurpose open space. Acoustic separation, plenty of storage and the possibilities of sub-spaces are required.

a. For infants, provide an area of 20 SF (2 SF/infant) where lightweight blocks can be manipulated (light wood, plastic, or styrofoam).

b. Provide a minimum 48 SF area for toddlers (minimum 2 SF/toddler).

c. The block play area may double-function with the place for woodworking if only preschoolers are being planned for. Provide a minimum 60 SF block play area and adjacent to it, one 100 SF place for woodworking.



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# child care centers

A-19

## FUNCTIONAL AREA

### Activity pockets (cont'd)

d. Separate block play from circulation and other activities by level change, low height barriers, raised platforms as work areas, changing floor surface materials and other architectural indicators.

## 12.science discovery area

Provide a science discovery area containing animals, plants, and physical science materials organized in a manner conducive to contemplative and participatory learning experiences in a naturally lighted, quiet, protected setting. When this program is included in the facility, the following criteria applies:

### a. Size:

- (1) Provide a minimum 40 SF for infants (minimum 4 SF/infant).
- (2) Provide a minimum 48 SF for toddlers (minimum 3 SF/toddler).
- (3) Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschooler).
- (4) Provide a minimum 65 SF area for school aged child (minimum 4 SF/child)

b. Locate the nature discovery area on the east or southeast side in good natural light. It may even be a partial greenhouse or plant sunroom.

c. Separate this area from more active spaces and circulation paths.

d. The science discovery area must be visible and accessible to older infants and toddlers in areas only where adult supervision is adequate.

e. The science discovery area may be located in porches and decks where climate permits.

f. The assortment of plants and animals should have all around viewing. In addition to stand-up displays, seating areas and comfortable pillows should be around the plants and animals to encourage children to enjoy them with minimal disturbance.

g. Natural light is essential. Control light levels with screens or shades.

h. Provide task lighting at standard level (fc).

i. Provide a view out.

j. Provide two child-safe 115-120V electrical outlets.

ARCHITECTURAL

# child care centers

A-20

## FUNCTIONAL AREA

### Activity pockets (cont'd)

k. Provide a child-accessible washbasin with hot and cold water.

l. Provide a child-accessible counter and work space with storage underneath. Counters shall be 20 inches high.

### 13. water area

Provide a protected, naturally-lighted water play area with a variety of immersible props and a generous water surface. Provide water-proof wall and floor materials and proper drainage. When this program is included in the facility, the following criteria applies:

a. Provide a minimum 20 SF for infants (minimum 2 SF/infants).

b. Provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler).

c. Provide a minimum 60 SF for preschoolers (minimum SF/preschooler).

d. This activity pocket may double-function with sand play area for toddlers and preschoolers.

(1) Locate water play area conveniently to wash rooms, towels, storage for water play objects and outdoor play areas.

(2) Locate away from circulation and quiet areas.

(3) Locate water play area adjacent to sand play area if they are not double-functioned, and with close proximity to nature area.

(4) Provide task lighting at 50 fc with multi-level switching to allow flexibility. This area should also have natural light and preferably a view out.

(5) Provide sink with cold and hot water and a floor drain.

(6) Provide non-slip surfaces impervious to water and dampness (e.g., a wooden grid set on floor with drain below).

(7) Water play props might include a spray flow from one height to another, pools eight inches or so deep for floating objects, and possibly a movable light source (battery operated) and wind source.

(8) Locate the surface of water at child height.

IVTITCITIDV

# child care centers

A-21

## FUNCTIONAL AREA

### Activity pockets (cont'd)

#### 14.sand area

Provide one or more sand play areas near water play areas. They should be on an abrasion resistant, cleanable floor surface. When this program is included in the facility, the criteria shall be as follows:

- a. In medium-sized centers, the sand play area can double-function with the water play area.
- b. In large centers, provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler).
- c. Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschooler).
- d. A window with direct sunlight is required to dry and purify the sand.
- e. Sand play area should be adjacent or close to a water source for play use and clean-up.
- f. Provide task lighting at the standard level (fc).
- g. When water is present, a floor drain is required.
- h. Provide a floor surface that is easy to clean, not susceptible to damage from sand, and as seamless as possible.

#### 15.woodwork area

Provide a place for woodworking and other tool activities within the block play area. When a woodworking space is included in the facility, the following criteria applies:

- a. For preschool, double-function the place for wood-working with block play area in medium size facilities. In large module plan centers, provide a minimum 60 SF area for 20 preschoolers (3 SF/child. For school-age children, provide a minimum 100 SF area (7 SF/child).
- b. This area should be separated from quiet zones.
- c. Separate this space from circulation. A semi-enclosed space may even be desirable.
- d. Natural light should be provided.
- e. Generated peak noise level can be 80 db. Reduce ambient and internal noise to 40 db.
- f. Provide storage for extra materials, display for materials in use, and storage for tools at child's reach.

# child care centers

A-22

## FUNCTIONAL AREA

Early infant area  
Older infant area

**Early infant area.** Create a special place with areas for cribs, food warming, storage, diapering, crawling, nursing and pockets to support activities like looking at books, exploratory play, etc. The early infant area should be separated, but not totally isolated, from the older infant, toddler and preschooler areas. Link the indoor infant area with the outdoor infant activity area.

a. Size the early infant area based on 35 SF of usable space per infant, exclusive of fixed equipment and storage. See Appendix C for the total space requirements.

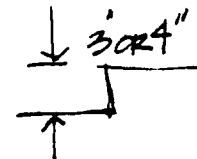
35 SF  
INFANT

b. Provide a series of non-hazardous developmentally graded, textured crawling areas with different levels, textures and colors.

(1) Size the textured crawling area based on 5 SF per infant, but provide a minimum size of 50 SF.

(2) Carpet the crawl area.

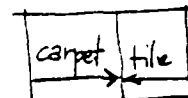
(3) Limit rises between levels to three to four inches. Construct the level changes using non-permanent construction materials, i.e., carpet covered movable wood platforms or cushions vice poured-in-place concrete.



c. Provide some areas that are walled and create wall areas of tactile and visual interest by using colors, textures, fabrics and carpeting. Locate these interest areas at heights of 6 inches to 20 inches above the floor (or from the eye level of a crawling infant to the average eye level of a standing infant).

d. Provide railings or other support devices to stabilize infant walking efforts in the older infant area only.

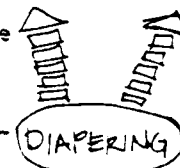
e. Provide some uncarpeted areas for wheeled toy activities and for feeding. Size this area to accommodate no more than six high chairs (this should not exceed 65 SF).



f. Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

g. Install all electrical outlets at 54 inches above the floor.

h. Design the diapering area to be efficient, protected from drafts, quiet and intimate. Locate the diapering area adjacent to the sheltered crib area and so that the caregiver can observe other children while diapering.



(1) Size the diapering area based on 2 SF per infant, but provide a minimum size of 15 SF.

ARCHITECTURAL

# child care centers

A-23

## FUNCTIONAL AREA

Early infant area  
Older infant area

(2) Provide a countertop with a sink for diaper changing and infrequent bathing. The countertop should be 34 inches high, 24 inches to 30 inches deep and a minimum of 60 inches to 72 inches long with a 3 inch to 4 inch raised edge on three sides for safety. Finish all surfaces with self-edging laminated plastic or other similar materials that are washable and warm to the touch. Provide a recessed porcelain sink with hot and cold water controlled by a single mixer faucet.

(3) Provide shelves and storage above and below the diapering surface and/or immediately adjacent to the changing area for diapering supplies and the infants' personal supplies. Provide an enclosed space for a container to hold soiled diapers. See Appendix F for additional storage requirements.

i. Provide space for a food warming area. Provide a self-edging laminated plastic countertop with backsplash, 34 inches high, 24 inches deep and 36 inches to 48 inches long for food preparation and warming.

(1) Provide four 115V electric outlets.

(2) Provide 50 fc task lighting.

(3) Provide space for a small under counter refrigerator.

j. Provide a staff toilet with a water closet and a lavatory with hot and cold water.

(1) Provide a mirror and medicine cabinet.

(2) Provide soap/towel/napkin dispensers.

(3) Provide a mechanical exhaust fan (two cfm per SF).

k. Provide a nursing area with a curtain that can be drawn shut. This area will be used by nursing mothers. It shall be comfortable and quiet and shall not exceed 60 SF.

4. Older infant area. Provide a separate space for the older infants, based on the criteria for the early infant area.

## Storage

ARCHITECTURAL

# child care centers

A-24

## FUNCTIONAL Toddler area..... AREA

### Requirements

Toddler area. Provide a toddler environment with activity areas, storage, diapering area, feeding and a toddler toilet room. Provide activity centers for two to five children for each major activity which is to be a part of the toddler curriculum, e.g., language development, arts and crafts, fantasy play, nature study, group games, reading, music, sand play, physical play, etc. See Appendix D for the total activity requirements.

a. Size the toddler area based on 35 SF of usable space per toddler, exclusive of fixed equipment, storage and the toilet. See Appendix C for the total space requirements.

35 SF  
TODDLER

b. Provide some uncarpeted areas for wheeled toy activities and for feeding. The size of this area shall be 1/3 of the usable room space.

c. Provide clusters of child-size tables and chairs to use for eating and play activities.

d. Provide some wall areas of tactile and visual interest by using colors, textures, fabrics and carpeting. Locate some of these interest areas at heights of approximately 28 inches above the floor (or at the average eye level of a standing toddler).

e. Provide the toddler activity area with direct access to the toddler outdoor activity area; this outdoor activity area should be easily accessible to the infant and preschooler (outdoor) activity areas.

f. Design the diapering area to be efficient, protected from drafts; quiet and intimate. Locate the diapering area adjacent to the sheltered toddler crib area and so that the caregiver can observe other children while diapering.

(1) Size the diapering area based on 1 SF per toddler, but provide a minimum size of 10 SF.

(2) For other requirements, refer to the requirements for the early infants diapering area.

g. Provide a toddler toilet room with space for an adult to assist a child. Provide one child-size water closet per 15 children and space for one potty chair per four children. See the section on Children's Toilets for additional design criteria.

### Storage

- 2 L.F. of open shelving at 15" for 2 to 3 yr olds and 18" to 22" for 3 to 4 yr olds in activity centers.
- 4' x 7" (8" o.c.) Provide 1 cubbie this size per toddler.
- Provide 20 CF of secured storage in activity center.

ADDITIONAL

# child care centers

A-25

<b>FUNCTIONAL AREA</b>	Preschool area.....
	Central storage.....

**Preschooler Area.** Provide an environment for the preschool age children with activity areas, storage and a preschooler toilet. Provide activity centers for two to five children for each major activity which is to be a part of the preschooler curriculum, e.g., arts and crafts, nature study, reading, music, etc.

a. Size the preschooler area based on 35 SF of usable space per preschooler, exclusive of fixed equipment, storage and the toilet. See Appendix C for the total space requirements.

b. Provide at least one area for large groups of up to 15 preschoolers. This area will be used for dance and other group activities and should be designed to be easily divided into smaller areas to permit greater use flexibility.

c. Provide the preschool age activity area with direct access to the preschool outdoor activity area.

d. Provide a preschooler learning toilet with space for an adult to assist a child. Provide one child-size water closet per 15 children. See the section on Children's Toilet's for additional design criteria.

## Storage

- Provide 2 LF of open shelving at 20" to 24" in activity centers.
- Cubbies - 4' x 11" (8" o.c.) with boot storage and sitting ledge. Provide 1 per child.
- Provide 20 c.f. of secured storage in activity center. (storage needs adapted from design guide appendix)

**Central Storage.** Provide a centrally located general purpose room for storage of books, audio-visual equipment and other resource materials.

a. Size the storage area based on 4 cubic feet per child, but provide a minimum size of 40 SF.

b. Control children's access to materials where necessary with lockable cabinets, etc.

ARCHITECTURAL



# child care centers

A-26

<b>FUNCTIONAL AREA</b>	School age area.....
	Dining/multipurpose....

**School age area.** The multipurpose room shall be used to accommodate the school age children and a separate area shall not be provided. See the requirements for the Dining/Multipurpose Area.

**Dining/multipurpose area.** Provide a dining area that shall also serve as a multipurpose area and double function as a space for school age children. The use of this area as a dining space is to be minimized. It is intended that the majority of the feeding occur in the activity rooms. However, this approach is dependent on an individual base's needs and requirements. The space shall be sized as a minimum, either to accommodate the various activities that occur in the multipurpose room or to accommodate the school age children or to feed a certain number of children at a given time, whichever is larger.

a. For school age area, provide a minimum of 35 SF of usable primary activity space per child for reading, music, arts and crafts and nature study. Provide storage for belongings and an unfinished space of 130 SF per 15 children (minimum 9 SF per child).

b. When space is to be used for dining, it shall be sized at a minimum to accommodate 1/3 of the children over 2 years old.

c. Provide a toilet adjacent to the dining/multipurpose area. This toilet will be used by both sexes and shall serve as public/staff toilet.

(1) Size the toilet on the basis of 3 SF per child, but provide a minimum sized area sufficient for one water closet and one lavatory for up to 15 children. The 3 SF rule shall be used for over 15 children.

(2) Size the number of plumbing fixtures in accordance with AFM 88-8, Chapter 4. Provide standard-size fixtures, including water closets and lavatories with hot and cold water.

(3) Provide a mechanical exhaust fan (two cfm per SF).

(4) Provide soap and towel dispensers and mirrors.

d. Provide a drinking fountain.

e. Provide storage for coats and personal belongings.

# child care centers

A-27

## FUNCTIONAL AREA

### Kitchen

Kitchen. Provide a kitchen with food preparation and related storage areas. Food preparation and storage should be centrally located and should contain four work centers: receiving, food storage, cooking and clean-up. The four work stations should be planned so that dry storage and receiving areas are closest to the exterior door while clean-up should be located closest to the serving line and have easy access to the other interior activity areas.

a. Provide space for two 30 by 30 by 48 inch food carts in the receiving area. Provide a telephone and one 115V electrical outlet.

b. Dry food storage:

(1) Design dry food storage with no windows but with adequate ventilation, protected from rodent infestation and lockable. These areas shall not be subjected to freezing, excessive heat or dampness and shall not be used for storage of non-food items such as mops, brooms, etc.

(2) Provide 21 inch deep shelving with a minimum 10 inches clear between shelves and with the lowest shelf 6 inches above the floor. If large storage containers for flour, sugar, etc., are to be used, provide a minimum of 36 inches clear between the lowest shelf and the next higher shelf.

(3) Use slotted, louvered or wire construction metal shelving vice solid shelving to provide better air circulation and maintenance. All metal shelving shall have a rust preventative finish and be fabricated in accordance with National Sanitation Foundation standards.

(4) If base cabinets are used for dry storage, provide cabinets 30 to 34 inches high, a minimum of 13 inches deep and with shelving spaced to accommodate no. 10 cans. All door openings shall be a minimum of 12 inches wide.

c. Cooking and clean-up:

(1) Use commercial grade kitchen equipment.

(2) Provide space for a trash container and for the storage of two food carts, 30 inch by 30 inch by 48 inches.

(3) Provide storage for dishes and for clean-up supplies. Keep this storage separate from the dry food storage. It may be in a separate closet or upright cabinets.

ARCHITECTURAL

## Major Kitchen Equipment List

Equipment Type	Range 1, 2, 5	Refrigerator <sup>2, 6</sup>	Freezer <sup>6, 10</sup>	Countertops/ Sinks <sup>8, 12</sup>	Dishwasher <sup>9, 10, 12</sup>	Electric Food Mixers <sup>10</sup>	Shelving LF
Up to 75 children	One 42-inch commercial heavy duty gas or electric	One commercial 2-section, 2-door, reach-in type (Approx. 55 CF) <sup>3</sup>	One domestic upright or chest of 20 CF.	16 L.F.	One commercial dishwasher, single tank door type. Provide soiled and cleaned dish table <sup>11</sup>	One 12-quart table model.	75
76 to 150 children	Two 36-inch commercial heavy duty gas or electric	Two commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 90 CF) <sup>3</sup>	One domestic upright or chest of 40 CF.	30 L.F.	DO	One 20-quart floor or table model 1 1/3 H.P. motor.	150
151 to 225 children	Three 36-inch commercial heavy duty gas or electric	Three commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 135 CF) <sup>3</sup>	Two domestic upright or chest. (One @ 20 CF) (One @ 40 CF)	45 L.F.	DO	One 30-quart floor model 1 1/2 H.P. motor.	225
226 to 300	Three 48-inch commercial heavy duty gas or electric	Four commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 180 CF) <sup>3</sup>	Two domestic upright or chest. @ 40 CF each.	60 L.F.	DO	One 60-quart floor model 1 H.P. motor	300

1 Range tops may be either open burners, hot tops or fry top (griddle) or any combination of same.

2 Ranges and other cooking equipment shall be equipped with an exhaust system. This system shall meet the requirements for hood (canopy), exhaust duct, grease removal device and fire extinguishing equipment as specified by local codes or in the National Fire Protection Association (NFPA) Publication 96, "Vapor Removal From Commercial Cooking Equipment and Have UL scale of approval.

3 Each shelf within refrigerator section should accommodate interchangeably one 18-inch by 26-inch sheet pan or two 12-inch by 20-inch hot food service pans. Both sections should have standard adjustable wire shelving, or the upper half of one section should have per files that can accommodate interchangeably 18-inch by 26-inch sheet pans and 12-inch by 20-inch hot food service pans.

4 Refrigerator shall be NSF and UL approved, 115 volts, single phase.

5 Oven may be convection-type with electrical blower fan for circulating air within oven compartment.

6 Provide exterior mounted built-in indicating thermometer; power indicator, high temperature, warning and interior lights.

7 This number is the total that can be provided. It may be in any combination of work tables and/or countertops as long as the total quantity is not exceeded. The tables should measure as a general rule from 4 to 8 feet long, 30 inches wide (24 to 48 acceptable) and 34 inches high. They should be constructed of 14-gauge 18-8 stainless steel with adjustable tubular legs and a full length undershelf for storage of sheet pans, hot food service pans. If built-in countertops over floor cabinets, under counter refrigerators, dishwashers, etc. are used as worktable, then the countertop should be in excess of 18" deep (from front to back) and 24" wide (from side to side). Countertop should be stainless steel.

8 Sinks shall be 14-gauge 18-8 stainless steel with integral drainboards. Each compartment should measure at least 30" x 24" x 14" deep with exterior-operated lever waste control. Separate drain system shall be provided for each compartment.

9 Commercial counter or under-counter, stationary rack with 2 1/2 to 3 minute wash/rinse cycle that uses either chemical sanitizing (final) rinse or hot water in excess of 180°F for final rinse. In the latter case, a hot water booster heater will be required to provide 180 degrees and indicating thermometers should be installed for measuring wash water and final rinse water temperature. A chemical sanitizing final rinse will preclude the necessity of a hot water booster.

10 Must have NSF and UL approval.

11 These tables shall be approximately 60 inches long and 27 inches wide each, of 14 gauge 18-8 stainless steel with backsplash and adjustable legs. Must have NSF approval.

12 Additional units may be provided at the option of the user.

NSF - National Sanitation Foundation  
UL - Underwriter's Laboratories

# ADULT EDUCATION

# child care centers

A-29

## FUNCTIONAL AREA

Isolation room.....

Staff toilet.....

Children's toilet.....

**Isolation.** Provide an isolation room to isolate and observe a sick child. Locate the room adjacent to the reception area and isolated from other children. The desk attendant should be able to supervise, observe and control access to the isolation room without leaving the desk area.

- a. Size the room to accommodate a cot or crib.
- b. Provide a toilet with a water closet and a lavatory with hot and cold water and a drinking bubbler.
- c. Provide a soap/towel dispenser. When used as a combined staff/isolation toilet, a mirror and medicine cabinet shall be provided.

**Staff toilets.** Provide toilets for the staff and the general public. (These toilets need not be separated by sex.) Design to accommodate the physically handicapped.

- a. Size the number of plumbing fixtures in accordance with AFM 38-3, Chapter 4.
- b. Provide water closets and lavatories with hot and cold water (Lavatories may be incorporated into countertops.)
- c. Provide mirrors, medicine cabinets and soap/towel/napkin dispensers.

**Children's toilets.** provide toilets easily accessible to the activity spaces and outdoor play spaces. One toilet room shall be shared by two activity spaces (at a minimum). This toilet sharing shall be limited to toddler and preschool areas.

- a. The toilets shall be shared by both sexes and shall accommodate the physically handicapped.
- b. Use child-scaled fixtures. Provide stools or steps in cases where children must use adult-scale fixtures. One area within toilet room shall be set aside for potty chairs.
- c. Provide one water closet per 15 children.
- d. Provide one lavatory with hot and cold water per 15 children and locate in activity space for visual control by staff. Limit the water temperature to 110 degrees. Provide a drinking bubbler.
- e. Provide easy-access traps for removing towels, toys, etc.
- f. Provide toilet paper holders, towel dispensers and paper storage.

# child care centers

A-30

## FUNCTIONAL AREA

Toilets(cont'd).....  
Laundry.....


g. Provide floor drain and slope floor to drain.

h. Provide seamless wall and floor surfaces which are non-slip, non-abrasive and easily cleaned. Avoid sharp corners and ceramic tile finishes.

**Toilet Options.** The school age toilets shall be used by staff and public. In centers not serving school age children, the following options shall be used:

a. In centers under 10,000 SF, the isolation toilet shall be used for staff toilet.

b. Staff toilets shall be combined with public toilet in centers over 10,000 SF.

**Laundry room.** Provide a laundry room close to the infants and toddlers activity areas and convenient to the food preparation area. The laundry room shall have adult-controlled access and be isolated from the activity areas as much as possible to minimize noise and safety problems.

~~a. See Appendix C for the space requirements.~~

b. Provide one washer and one electric dryer. The equipment shall be commercial grade. Provide a washer plumbing box with hot and cold water faucets and a standpipe for the washer; provide a vent with an easily accessible lint trap for the dryer. Provide 115V and 220V electrical outlets for the washer and dryer, respectively. Provide appropriate connections for gas dryer if applicable.

c. Provide a single compartment laundry tub with hot and cold water.

d. Provide a self-edged laminated plastic countertop, 34 inches high, 24 inches deep and 48 inches to 72 inches long, for folding laundry, etc. Provide two 115V electric outlets above countertops.

e. Provide secured storage for laundry supplies and open storage for clean and dirty laundry.

f. Provide a floor drain; slope floor to drain.

g. Provision of a thermostat-controlled exhaust fan is optional.

h. Limit the ambient noise level to 50 dBA.

i. If the need exists for more than one washer and dryer, then the base laundry facilities shall be used.

ARCHITECTURAL

# child care centers

A-31

## FUNCTIONAL AREA

Janitor closet.....  
Mechanical room.....

**Janitor closet.** Provide a janitor closet with a slop sink with hot and cold water and storage for mops, pails, vacuum cleans and related cleaning and maintenance supplies and equipment.

a. Provide approximately 12 SF for storage of one janitor's cart, plus an additional 20 SF supply storage for each 75 children module.

b. Provide open shelving and wall-mounted cabinets to store maintenance-related tools and supplies.

c. Provide keyed locks on the janitor's closet door and on the cabinet doors.

d. Provide a floor drain; slop the floor to the drain.

**Mechanical equipment room.** Provide space for mechanical and electrical equipment. Isolate this space from other spaces as much as possible.

a. Install sensors and controllers for the EMCs to monitor climate control and the operation of the mechanical equipment; connect to the base master control room equipment, if applicable.

b. Mechanical equipment room shall open directly to the exterior of the building. Provide double doors.

c. Provide outside air supply and exhaust for the fan room.

d. Provide space for electrical distribution panels.

h. Limit the peak noise levels to 85 dbA within the room and to 25 dbA to the administration and activity areas. Minimize vibration transmission to these areas as well.

f. All fuel storage shall meet five safety codes.

ARCHITECTURAL

# child care centers

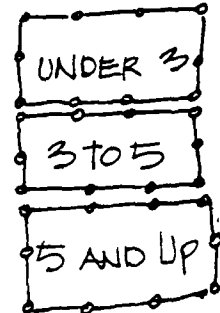
A-32

## FUNCTIONAL AREA

## Outdoor activity areas (general)

Outdoor playgrounds. Children's play is critical to psychomotor, intellectual and social development. Adventure play, creative play and environmental play should be emphasized in child care playgrounds.

Provide outdoor playgrounds which are planned as a series of separated but linked activity areas with clear circulation and designed in accordance with design principles for indoor activity areas. Provide three distinct areas for the following age groups: 3 and under; 3 to 5; and 5 and older. All playground's fences shall be a minimum of 5 feet high. Avoid fencing materials that encourage climbing or produce splinters. Develop the play areas to permit some cross-age groupings on a limited scale.



### 1. General Design Guidelines:

- a. Zone the playground in response to site conditions, age groups and activity.
- b. Scale the site and the play equipment appropriately for each age group.
- c. Provide proper drainage on the site to extend the season of use and to allow outdoor play soon after inclement weather.
- d. Playgrounds should be close to restrooms and outdoor water fountains.
- e. If an outdoor use space must be created on a northeast or northwest side of the site, keep the building on the north side of the site as low as possible to minimize the shade created by the building.
- f. Consider surfacing materials that dry quickly (paving, asphalt) for porches and wheel toy circulation paths and pads. Limit the use of this type of material to the aforementioned areas only. A mixture of various surfacing materials such as grass, sand, artificial turf and others shall be utilized as appropriate.
- g. Design the indoor play areas and other spaces which rely on visual connection to the outdoors so that children do not have to look into the sun. Overhangs and other natural shading features will reduce the solar heat load.
- h. The same party responsible for the facility design shall design the playground equipment and support/foundations. All equipment foundations shall conform to current safety standards.
- i. Site the outdoor play areas to permit adequate supervision.

ARCHITECTURAL

# child care centers

A-33

## FUNCTIONAL AREA

## Outdoors (cont'd) Infants

2. Porches and Decks. Consider the use of porches and decks as part of outdoor activity spaces. If these are included in the design, apply the following criteria:

a. Provide approximately 1 SF per child for porches and decks as activity spaces with a minimum area of 50 SF. In calculating building gross square footage, calculate these areas at 50%.

b. Locate porches on the most sheltered side of the building in hot climates, and on the sunny side, away from prevailing winds in colder climates.

c. Relate the porch directly to the appropriate indoor activity areas and to the architecture of the building.

d. Provide close proximity to a clean-up area and toilet rooms.

e. Provide a minimum width of 7 feet for a porch or deck space.

f. The play areas will be most usable when the more sheltered areas are next to the building and the more open areas are blended with the outdoor playgrounds.

g. Ensure the porch drains easily and has a quick-drying surface.

### infants

a. For the 3 years and under group, provide clearly defined infant and toddlers areas conforming to the following guidelines:

(1) These two areas are separate but not isolated from each other and other age groups. Connect the infant area to indoor infant spaces.

(2) Create soft, multi-textured, crawling surfaces with warm materials, and play spaces which are infant-scaled but safe for use by infants and young toddlers. Include small steps, slopes, climbing ramps, slight barriers, and slides in this area.

(3) Provide an outdoor area for toddlers responsive to the needs of their physical, social, and cognitive development. Allow for individual and small-group activities.

(4) Size the activity area based on 50 SF per infant and 100 SF per toddler, but provide no less than 2100 SF for the total area.

(5) Provide direct access to infant indoor activity spaces. Do not use steps.

(6) In infant areas, provide a variety of surface materials such as wood and asphalt for push or ride toys and grass and sand for crawling.

ARCHITECTURAL



# child care centers

A-34

## FUNCTIONAL Outdoors (cont'd)

AREA	Toddler	Other
------	---------	-------

### toddler

For toddler areas, provide a variety of areas and surfaces such as protected sand and dirt play, informal playing areas, open grassy playing areas, and designated play structures. Provide areas to support social play and peer interactions, e.g., nests for quiet play and small arts and crafts nooks. Provide areas that support cognitive development, such as children's gardens.

For the 3 to 5 year old group, provide outdoor activity spaces.

(1) Provide a variety of activity areas. Areas should be sized to handle both individual and group activities.

(2) See the activity area based on 100 SF per preschooler.

(3) Provide spaces for activities in open grassy play areas, informal paved areas, and designated play structures.

(4) Provide a minimum of 200 cubic feet of outdoor storage. This storage should be child-accessible, vandal-proof, and weathertight. Locate the storage units throughout the play space to hold items needed for special activities, e.g., in the arts and crafts area, blocks in a creative play area, etc.

### other

For the five year old and older children, provide a special outdoor activity area. This area should allow for exploration, challenge, and modification, and support individual or group activities which promote cooperation.

(1) Size the activity area based on 100 SF per child.

(2) Locate this area close to community-shared public park space and playing fields near the facility for overlap use.

(3) Provide a variety of activity spaces that offer challenge without extreme competitiveness, e.g., single basketball hoops rather than entire courts, small baseball and soccer areas, and climbing elements like good climbing trees or built structures.

(4) Provide areas for environmental yards, adventure play areas, supervised fire and cooking areas, picnic areas, covered play pavilions, fenced animal areas, and children's gardens.

(5) Provide outdoor storage as appropriate for special areas, e.g., tool shed for environmental yard and children's gardens, supply shed for adventure play areas, etc. All of this storage should be accessible to school-aged children, and be lockable, weathertight and vandal-proof.

ARCHITECTURAL

# child care centers

E-1

## LIGHTING

### 1. General:

a. Combine natural and artificial light to provide adequate task and general lighting which can be modified to respond to changing needs.

b. Daylight from windows and skylights should be used when appropriate.

### 2. Criteria:

a. Maintain illumination levels at 50 fc for task lighting on all activities requiring perceptual acuity (reading, drawing, color and shape discrimination tasks, staff administration work, testing, etc.) and 30 fc for background lighting and all other activities not requiring close perceptual acuity.

b. Provide brightness ratios of 3:1 between task and background. In addition to controlling artificial lighting ratios, use siting baffles, roof overhangs, shades, etc., to control the natural light brightness ratios. Provide adequate lighting in entry spaces to permit gradual adaptation to outdoor-indoor ratios much greater than the interior.

c. Control lateral differences in illumination, especially those created by strong side natural lighting in an activity space. Use sun shades, light attenuation devices, etc., and orient activity pockets, work surfaces and storage units so that light comes from behind most activities and children.

d. Provide sufficient controls over the natural and artificial lighting sources to give lighting flexibility. Use multi-ballast switches, dimmer switches, track lighting, movable lights, etc.

e. Provide high shielding luminaries with a cutoff angle of about 30° for task lighting areas.

f. Equip child care centers with an internal communications system. Control panel at reception desk with hands-off instruments in all care areas and playground.

g. Provide night lighting in non 24-hour centers in lobby and/or cash areas that are visible from outside.

h. Where fluorescent fixtures are required, use broad spectrum fluorescent lamps. Narrow spectrum fluorescent bulbs are not to be used. Designs shall employ a mix of fluorescent, incandescent and natural lighting.

Backup generators are recommended for all child care facilities to operate lighting during power failure.

Where backup generators are not provided, other emergency lighting is required in all means of egress.

# child care centers

E-2

## POWER

1. General: Sufficient electrical outlets, out of children's reach should be available throughout all primary and secondary spaces to provide for power and lighting needs.

2. Criteria:

a. Each primary and secondary activity space should have one 115V convenience outlet every 12 feet along perimeter walls.

b. Consider integrating lighting and electrical systems into floor or ceiling grids and into movable working walls to provide future flexibility.

c. Keep all outlets in spaces accessible to children out of their reach. Height of outlets should be minimum 54 inches above finished floor. In child accessible areas where and if necessary to locate receptacles lower than 54 inches from finished floor (e.g., 18 inches above finished floor), the receptacles shall have a cover that must be twisted prior to inserting plug.

3. Where necessary, provide pad-mounted exterior transformers in dead front enclosures.

## UTILITIES

1. Electric wiring shall be installed in accordance with the National Electric Code, NFPA 70.

2. Equipment utilizing gas and related gas piping shall be installed in accordance with National Fuel Gas Code, NFPA 54.

3. Air conditioning, heating, and ventilating ductwork and related equipment shall be installed in accordance with the applicable standard on Air Conditioning and Ventilating Systems, either NFPA 90A or 90B.

## FIRE PROTECTION

8. The power supply for fire alarm and detection systems shall be connected in the following manner: Commercial/backup power → battery charger → battery → detection circuit. The system shall operate from battery power constantly, thus eliminating power interruptions.

9. An annunciator panel shall be installed in the main entrance (lobby) area which indicates exact room of alarm. Sprinkler alarm is not required to be distinguished by area/room.

# child care centers

E-3

## ELECTRICAL REQUIREMENTS BY AREA

### ENTRY/LOBBY/RECEPTION

Provide ambient lighting of 20 fc with multi-level switching to allow for lighting flexibility.

Provide task lighting of 100 fc over work spaces and ambient lighting of 50 fc elsewhere with multi-level switching to allow for lighting flexibility.

PROVIDE AT LEAST TWO ELECTRICAL  
OUTLETS AND A HOOK-UP FOR A PAY TELEPHONE.

### DIRECTOR'S OFFICE

Provide a telephone and four standard 115V electrical outlets.

Provide ambient lighting of 50 fc and task lighting of 100 fc.

### STAFF ROOM

Provide a minimum of two 115V electrical outlets, a telephone, an antenna or cable hookup for TV, an electric clock and space for a video-tape machine.

Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

### ACTIVITY AREAS

Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

### DINING/MULTIPURPOSE ROOM

Provide task lighting of 20 fc with multi-level switching to allow for lighting flexibility.

Provide a wall-mounted extension phone.

### KITCHEN

Provide ambient lighting of 100 fc.

Provide ambient lighting of 15 fc and 50 fc task lighting over work counters.

### ISOLATION

Provide 30 fc dimmable incandescent lighting.

ELECTRICAL

# child care centers

M-1

## HVAC

### 1. General.

a. Design the heating, ventilating and air quality systems to be responsive to children's needs. Zone for different comfort needs in different activity spaces.

b. Small children's physiological response to temperature, humidity, and air quality are different from adult needs and will vary according to the level and type of activity. Children spend much time on the floor and near the floor; consider the temperature and air quality at this level.

### 2. Criteria:

a. Standardize design temperatures in all rooms occupied by children at 68° F. in the winter and no higher than 78° F. in the summer, measured within 1 foot of the floor. Exceptions to this standard are given in appropriate spaces.

b. Zone active spaces for lower temperatures and quieter, sedentary spaces for higher temperatures.

c. Site the building for passive energy conservation, insulate well and design for active solar gain where appropriate.

d. Provide for relative humidity of 40-50% in all spaces used by children.

e. Provide a minimum of 5 cubic feet per minute of outdoor air per occupant, with six to eight air changes per hour, unless otherwise indicated.

f. Provide uniform air velocities of 25-40 feet per minute, 1 foot from the floor, unless otherwise noted.

g. Provide tamper-proof thermostats in all primary and secondary activity spaces, located 36 inches from the floor.

h. Provide mechanical exhausts for all kitchens, toilets, laundries, dining, and food preparation spaces.

## PLUMBING

1. Design the plumbing in child care facilities for easy use by children. Provide individual shut-off valves for each fixture, and floor drains in each area. Fixtures shall be sized for the age group served, except in areas reserved for adults.

2. In addition to bathrooms, provide hot and cold water and wash basins in activity spaces as required.

3. Provide floor drains in all toilets, laundries, janitor closets, kitchens, and water play areas to prevent flooding. Provide deep seal traps in areas that do not normally stay wet.

4. Maximum water temperature should be 110 degrees. Provide appropriate measures in all child accessible areas to prevent children from being exposed to scalding water.

5. Provide drinking fountains in each major care area for children 3 years and older and on the playgrounds.

# child care centers

M-2

## Water Supply and Fire Hydrants

1. Water supply for installed fire suppression systems shall be required as a part of the project for new facilities. Water supply requirements are contained in AFM 88-10 and NFPA 13.
2. Fire hydrant spacing shall be in accordance with AFM 88-10. At least one hydrant shall be within 200 feet of the facility.

## Fire Protection Systems

1. An automatic fire alarm and detection systems (FADS) is required in all areas of the child care center. In sprinklered areas, the sprinkler system serves as the FADS as well as the suppression system.
  2. The FADS shall consist of an automatic smoke detection system in all sleeping areas, and an automatic heat detection system in all other areas. All areas except sleeping area that are sprinklered do not require a smoke and heat detection system.
  3. All child care centers require an automatic wet or dry pipe sprinkler system in all hazard areas. Hazard areas include kitchens, utility/boiler/mechanical rooms, closets, storage rooms, lounges, offices and laundry rooms.
  4. A manual fire and evacuation alarm is required.
  5. All FADS must transmit a signal to the fire department serving the center.
  6. All facilities that are not single story, slab on grade construction, require total protection with automatic sprinklers.
  7. Kitchen range hoods shall be equipped with a dry chemical type automatic extinguishing system when the hood serves a deep fat fryer or open burners.
- . Fire department connections to support sprinkler systems shall be accessible. They shall not be located inside fenced areas, or other locations requiring special procedures to gain access.

# child care centers

M-3

## REQUIREMENTS BY AREA

### DINING / MULTIPURPOSE

- Provide eight to ten air changes per hour.

### KITCHEN

- Provide a separate thermostat for the kitchen and limit the temperature range to between 62 degrees F and the standard temperature levels.
- Provide a forced air exhaust with a grease filter.
- Provide 10-12 air changes per hour.
- Provide a thermometer with a temperature range from minus 20 degrees F to plus 120 degrees F in 2 degree divisions. Control the temperature range in the storage area, however, to between 50 and 70 degrees F.
- Provide for relative humidity of 20% with separate controls and a separate thermostat.
- Provide four air changes per hour.

### STAFF TOILET

- Provide a mechanical exhaust fan (two cfm per SF).
- This area will be shared with other toilets. See section on toilet options.

### CHILD TOILETS

- Design temperatures shall be 68 degrees minimum in the winter and 78 degrees maximum in the summer, measured at a height 1 foot above the floor.
- Provide a mechanical exhaust fan (two cfm per SF).

### LAUNDRY

- Provide three to five air changes per hour.

### ISOLATION

- Provide 10 to 12 air changes per hour.

MECHANICAL

# child care centers

C-1

## SITE SPECIFIC INFORMATION

- IDENTIFY EXPECTED NUMBER OF EACH AGE GROUP OF CHILDREN EXPECTED TO USE THE FACILITY.
- IDENTIFY THE EXPECTED FREQUENCY OF USE OF THE FACILITY
- IDENTIFY FACILITY OPERATING HOURS
- IDENTIFY EXISTING UTILITIES AVAILABLE FOR USE (POWER, WATER, SEWER, GAS, COMMUNICATION LINES, ETC)
- IDENTIFY PREDOMINANT ARCHITECTURAL STYLE OF BASE
- IDENTIFY SEISMIC ZONE, TYPHOON-HURRICANE-WIND/SNOW LOAD DESIGN CRITERIA
- IDENTIFY POTENTIAL OF ALTERNATE ENERGY USAGE
- IDENTIFY EXPECTED NEEDS FOR FUTURE EXPANSION
- IDENTIFY SITE CONDITIONS WHICH WILL AFFECT FACILITY DESIGN
- IDENTIFY EXISTING FACILITIES AND EQUIPMENT AVAILABLE FOR POTENTIAL USE IN CHILD CARE CENTER DESIGN
- IDENTIFY ITEMS WHICH WILL BE GOVERNMENT FURNISHED
- IDENTIFY THE SIZE OF THE FACILITY ACCORDING TO THE STANDARDS SET FORTH IN THE PROGRAMMING SECTION OF THIS PACKAGE.

## EVALUATIVE

(THIS PAGE IS PROVIDED AS EXAMPLES OF AN EVALUATIVE CHECKLIST)

- FACILITY NOT LOCATED NEAR HAZARDS OR NUISANCES SUCH AS ODORS, SMOKE, HEAVY TRAFFIC, DUST AND POLLUTION, SECURITY AREAS, RAILROADS, OR AIRCRAFT RUNWAYS
- FACILITY SITED TO ALLOW EASY ACCESS AND GOOD VIEW
- FACILITY ORIENTED FOR ENERGY CONCERNS
- TYPE "N" CONSTRUCTION
- DESIGN BASED ON 75 SQUARE FEET PER CHILD
- NO LEAD BASED PAINTS USED IN THE FACILITY
- ALL FIRE PROTECTION REGULATIONS COMPLIED WITH (COULD BE A SEPARATE MORE DETAILED CHECKLIST)
- SUFFICIENT OUTDOOR AREAS PROVIDED FOR EACH AGE GROUP
- ALL ELECTRICAL REQUIREMENTS MET (POSSIBLE SEPARATE CHECKLIST)
- ALL MECHANICAL REQUIREMENTS MET (POSSIBLE SEPARATE CHECKLIST)



## Air Force References

- AFM 86-2, STANDARD FACILITY REQUIREMENTS
- AFM 88-10, WATER SUPPLY
- AFM 88-15, AIR FORCE DESIGN MANUAL, CRITERIA AND STANDARDS FOR AIR FORCE CONSTRUCTION
- AFP 88-40, SIGN STANDARDS
- AFP 88-41, AIR FORCE INTERIOR DESIGN PAMPHLET
- AFR 215-1, AIR FORCE MORALE, WELFARE AND RECREATION (MWR) PROGRAMS AND ACTIVITIES
- AFR 215-7, CHILD CARE DEVELOPMENT PROGRAM
- AFR 216-6, MWR AND TRANSIENT BILLETING, CONSTRUCTION, ARCHITECTURE, KITCHEN AND INTERIOR DESIGN PROGRAMS
- ANNUAL AIR FORCE PRICING GUIDE
- DOD 4270.1M, CONSTRUCTION CRITERIA MANUAL
- NFPA 54, NATIONAL FUEL GAS CODE
- NFPA 70, NATIONAL ELECTRIC CODE
- NFPA 90A, AIR CONDITIONING SYSTEMS
- NFPA 90B, WARM AIR HEATING AND AIR CONDITIONING
- NFPA 96, COMMERCIAL COOKING EQUIPMENT, VAPOR REMOVAL
- NFPA 101, LIFE SAFETY CODE
- USPH, PHS PUBLICATION # 934, FOOD SERVICE SANITATION MANUAL

## Other References

- AVERBACH, STEVANNE (ed). CREATIVE CENTERS AND HOMES, VOLUMES THREE AND FOUR IN THE SERIES "CHILD CARE: A COMPREHENSIVE GUIDE". HUMAN SCIENCES PRESS, NEW YORK, 1978.
- BARTHOLOMEW, ROBERT, AND OTHERS. CHILD CARE CENTERS: INDOOR LIGHTING, OUTDOOR PLAYSCAPE. CHILD WELFARE LEAGUE OF AMERICA, NEW YORK, 1974.
- EVANS, E. BELLE, GEORGE SAIA, AND ELMER EVANS, DESIGNING A DAY CARE CENTER. BEACON PRESS, BOSTON, 1974.
- EVANS, E. BELLE, BETH SHUB, AND MARLENE WEINSTEIN. DAY CARE. BEACON PRESS, BOSTON, 1971.
- OSMAN, FRED LINN. PATTERNS FOR DESIGNING CHILDREN'S CENTERS. EDUCATIONAL FACILITIES LABORATORY, NEW YORK, 1971.

# child care centers

UE-1

THIS EVALUATION FORM IS PROVIDED TO PROMOTE USER EVALUATION OF AND INPUT TO THIS INFORMATION PACKAGE. YOUR COMMENTS ARE BOTH ENCOURAGED AND WELCOMED. THIS FORM MAY BE FORWARDED TO THE FOLLOWING ADDRESS:

HQ USAF/LEEE  
BOLLING AFB, MD. 20336

1. FOR WHAT PURPOSE DID YOU USE THIS PACKAGE?
2. WAS THE INFORMATION LOGICALLY ORGANIZED FOR YOUR PARTICULAR USE?
3. WAS THE INFORMATION EASY TO FIND?
4. WAS THE INFORMATION EASY TO UNDERSTAND?
5. WHAT SUGGESTIONS, IF ANY, DO YOU HAVE FOR ADDITIONAL INFORMATION TO BE INCLUDED IN THIS PACKAGE?
6. WHAT SUGGESTIONS, IF ANY, DO YOU HAVE FOR DELETION OF ANY INFORMATION CONTAINED IN THIS PACKAGE?
7. DO YOU THINK THE DETAIL OF INFORMATION PROVIDED IN THIS PACKAGE IS APPROPRIATE?
8. DO YOU HAVE ANY SUGGESTIONS WHICH YOU FEEL COULD IMPROVE UPON THE BENEFITS PROVIDED BY THIS PACKAGE?

(YOU MAY CONTINUE ANSWERS ON THE REVERSE IF NECESSARY)

## Evaluation of the FTIP

The evaluation of the proposed facility type information package includes an evaluation of the processes involved in its development and use. The evaluation consists also of a comparison with previous Air Force methods of transmitting design information. The criteria to be used in the evaluation are those identified in Chapter III. The evaluation discussion will examine each of the major categories shown in Table 3.6. Table 4.2 is a reprint of Table 3.6 and has been reproduced at the end of this chapter to summarize the evaluation.

### Uses

The proposed FTIP contributes significantly to all four of the identified uses of facility type information packages. The evaluatory use is slightly limited due to the absence of the behavioral criteria mentioned earlier. The hierarchical presentation aids the delivery of both educational and informational facts, while the wide use of graphics and the incorporation of example floor plans encourage the promotional use of the FTIP. The evaluatory process is aided by the provision of a checklist of required items.

### Users

The proposed FTIP contains information presented both technically and nontechnically. The division of the

facility type information into packages allows appropriate information to be delivered to each of the primary users. The previous methods of transmitting facility type information were oriented primarily for the designers of Air Force facilities.

#### Content

The proposed FTIP meets a majority of the content criteria shown in Table 4.2. The criteria not fully met will be discussed to highlight areas for future improvement. Improvement is recognized as an on-going evolutionary process. The first criterion that is somewhat deficient is the area of cost information. The ability to maintain current and accurate cost estimates for facility components in a facility type information package is affected by the updating cycles of the packages and the general distribution of the package. The distribution of a facility type information package to various areas can affect the accuracy of cost information contained in the package.

The guide for site specific information provided in the FTIP is a simplistic example. A more elaborate checklist would also contain more of the areas addressed in a Project Book.

As mentioned earlier, the identification of behavioral criteria is still in its infancy. As methods for behavioral evaluation are developed, they should be incorporated into FTIPs.

A comparison of the FTIP with previous methods indicates that both the FTIP and the design guides provided more of what was wanted in the area of content. The highlights of the FTIP are a method for allowing and choosing different types of information detail levels, the beginning of cost incorporation into facility type information packages and better listed criteria.

#### Communication

The primary effort of this research was how to best transmit facility type information. Any time information is transmitted or transferred, communication occurs. Table 4.2 displays the area of communication improvements. Seven of the nine communication criteria were improved upon. The improvement in the reaching of criteria translates into better communication of information, which ultimately translates into dollar savings.

#### Accessibility

The distribution of facility information to meet user requests affects the accessibility of the information and the costs of information delivery. By delivering information on an "as needed" basis, information and the costs of information delivery are less costly. By delivering information on an "as needed" basis, information is more efficiently and probably more effectively transmitted.

Comparison with previous methods indicates an

improvement. The design guides will possibly be distributed on an "as needed" basis as is suggested for the FTIP, but at the time of this report, the design guides were still in development, and distribution procedures were not indicated.

#### Evaluation and Update

The provisions for evaluation and update of the FTIP are a much simpler and a more readily available process than anything previously used. The provision of user evaluation forms in each package promotes user feedback. The simple updating process used for the design guides was retained in FTIP development.

#### Costs

It seems quite common to end an evaluation or comparison of various systems by looking at the costs of each. Sometimes this comparison of costs neglects a parallel analysis of benefits. Benefits that can translate into cost savings over the life of the system may not be readily apparent during the development of the system. The evaluation and comparison of the costs of FTIP's with the previous methods of transmitting facility type information will include an examination of both benefits and costs. Costs are an accounting of what it takes to get a package, and benefits are an accounting of what will be lost if a package is not implemented. If a benefit-to-cost ratio is improved by implementation of the proposed FTIP, then cost savings

are realized. Costs will be examined first, followed by an examination of both the quantifiable and some of the unquantifiable benefits provided by the proposed Facility Type Information Package (FTIP).

The costs of an FTIP are divided into the same subsidiary costs discussed for Definitive Designs and design guides. Figure 4.5 compares the relevant costs.

The other area of concern in this analysis is potential benefits. Benefits are defined here as advantages over the design guides. Benefits are commonly ignored if the benefit is unquantifiable. The benefits of implementing the FTIP are both quantifiable and unquantifiable.

Quantifiable benefits are those which can be translated into dollar savings. One such benefit is the potential reduction in design time. The formatting and presentation of the proposed FTIP accomplishes part of the architect's work--the transformation of information into a format useable in design and, in the case of a category one FTIP, provides the necessary floor plan. If FTIPs are provided to an AE design firm, then less production time is, theoretically, necessary. Another potential benefit of the proposed FTIP is a decreased chance of information omissions which can be attributed to the hierarchical format and graphic reminders. Deletion of important issues can result in substantial correction costs at a later date.

Development	Design Guide	FTIP
cost per page.....	1000	1234 (a)
X average # of pages....	35	18.8 (b)
TOTAL....	35,000	23,200
X number of facility types	250	250 (c)
TOTAL DEVELOPMENT COST....	8,750,000	5,800,000
<b>Reproduction</b>		
Average number of pages/facility	35	18.8
X number of facility types...	250	250
TOTAL PAGES/SYSTEM.....	8750	4700 (d)
Printing cost per 1000 pages.	20	20
TOTAL REPRDUCTION COST...	175	94
<b>Distribution</b>		
Reproduction cost/system	175	94
X total number delivered.	150	75 (e)
TOTAL DISTRIBUTION COST.....	26,250	7050
<b>Updating</b>		
Updating cost per page..	20 (f)	55 (g)
Estimated 1% update/5 year period	88	47
TOTAL UPDATING COST.....	1760	2585
<b>TOTAL</b>	<b>8,778,010</b>	<b>5,809,635</b>

- (a) Based on an average of categories from Table 4.1.
- (b) Based on average # of pages, given FTIP categorization.  

$$\left( \frac{\sum [B \times C]}{\sum B} \right)$$
- (c) Assuming same number of facilities as in design guides.
- (d) Total of columns (BxC) in Table 4.1 [  $\sum (B \times C)$  ].
- (e) Author estimate of "as-needed" distribution based on distribution of partial packages as the only "as-needed" requirement.
- (f) Author estimate.

FIGURE 4.5: Design Guides Versus FTIPs (costs)



The provision for variances in package development proposed in the FTIP system allows another benefit: it allows the contents (and subsequent costs) of a package to vary with the required design flexibility. Table 4.1 illustrates the potential savings.

The discussion of benefits and costs of the FTIP system allow for a benefit/cost (B/C) ratio to be examined. The B/C "way of thinking" mentioned earlier in Chapter III can be used when all benefits are not quantifiable. The costs compared in Figure 4.5 show a reduction in costs from adoption of the proposed FTIP. That point alone increases the B/C ratio. If you combine the cost savings with the increased benefits, the B/C ratio rises again.

This chapter has presented some guidelines for development and use of a facility type information package, an example of the package, and a comparison of the proposed FTIP with the previous methods of transmitting facility type information. This evaluation is summarized in Table 4.2.

Table 4.1 Cost Savings from FTIP Categorization

CATEGORY	COST/PAGE	# FACILITIES (**)	# PAGES	TOTAL	ALL CATEGORY
I	6000	50*	2	600,000	III OR IV
II	4000	50*	2	400,000	250 FACILITIES(**)
III	1000	100*	30	3,000,000	X 30 Pages Each
IV	1200	50*	30	1,800,000	X1100 Avg. Development Cost/Page
		250		5,800,000	\$8,250,000
					-5,800,000
					3,450,000
S a v i n g s					

\*Author estimate

\*\*Same # of facilities as design guides

Table 4.2 The Evaluation

# CRITERIA CHECKLIST

		FTIP	DESIGN GUIDE	BURLES	DEFINITIVE
USES	• INFORMATIONAL				
	• PROMOTIONAL				
	• EVALUATORY				
	• EDUCATIONAL				
USERS	• TECHNICAL/NONTECHNICAL				
	• AIR FORCE/NON AIR FORCE				
	• PROGRAMMER'S FORMAT				
	• DESIGNERS FORMAT				
CONTENT	• GUIDELINES FOR CHOOSING FACILITY TYPES				
	• GUIDELINES FOR CHOOSING DETAIL LEVEL				
	• PURPOSE				
	• FUNCTIONAL REQUIREMENTS				
	• SPACE REQUIREMENTS				
	• HEALTH/SAFETY CONSIDERATIONS				
	• GROWTH AND FLEXIBILITY				
	• INTERRELATIONSHIPS OF SPACES				
	• USER IDENTIFICATION AND PATTERNS				
	• COST INFORMATION				
	• EXAMPLE FLOOR PLANS				
	• GUIDE FOR SITE SPECIFIC INFORMATION				
	• GUIDE FOR USER INPUT AND EVALUATION				
	• CRITERIA FOR TECHNICAL EVALUATION				
	• CRITERIA FOR FUNCTIONAL EVALUATION				
	• CRITERIA FOR BEHAVIORAL EVALUATION				
	• TABLE OF CONTENTS				
	• INSTRUCTIONS FOR USE				
	• REFERENCES				
	• PRIORITIZED FORMAT				
	• INDEX OF TERMS				
	• INFORMATION MODULES				
COMMUNICATION	• RELATES TO USERS				
	• INFO GIVEN ONLY AS NEEDED				
	• HIERARCHICAL PRESENTATION				
	• SHORT WORDS AND SENTENCES				
	• STANDARD PAGE LAYOUTS				
	• SECTION/TITLE EACH PAGE				
	• STANDARD TOPIC HEADINGS				
	• PRESCRIPTIVE INFORMATION				
	• SEQUENTIAL - IN ORDER OF USE				
ACCESSIBILITY	• USE OF GRAPHICS				
	• GRAPHICS RELATED TO TEXT				
	• LEVEL OF DETAIL BY USER				
	• TIMESpan - ADEQUATE				
EVALUATION AND UPDATE	• FREQUENCY OF USE ACCOUNTED FOR				
	• PROVISION FOR PACKAGE EVOLUTION				
	• UPDATE PROCESS READILY ACCESSIBLE				
COSTS	• SIMPLICITY OF UPDATE				
	• REDUCTION OF DEVELOPMENT COSTS				
	• REDUCTION OF REPRODUCTION COSTS				
	• REDUCTION OF DELIVERY COSTS				
	• REDUCTION OF UPDATING COSTS				
	• REDUCTION OF AE FEES				
	• INCREASE IN BENEFIT COSTS RATIO				
	• PACKAGE ADEQUATE BY ITSELF FOR CONGRESS				
	• COST CRITERIA PROVIDED				
	• REDUCTION OF TOTAL SYSTEM COSTS				

☒ FULL COMPLIANCE 
 ☐ PARTIAL COMPLIANCE 
 ☐ CRITERIA NOT MET

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

The conclusions of a report are usually author inferences from the research or summarizations of the research. The criteria listed at the end of Chapter III are inferences from the initial research. The inferences from the literature review and other sources have found their expression in the design information package presented. In that sense they were conclusions drawn from the first research stage which became assumptions for package development. Consequently, it is appropriate to restate the assumptions as a general summary of the ideas conveyed.

The research and development process involved with the proposal of the Facility Type Information Package led to several conclusions. These were:

1. Facility type information packages have been and will continue to be used for more than providing design information they were originally to provide. A secondary usage is the providing of Air Force programming information. This information is more general in nature than what is needed for design. Another use of FTIPs is to aid the evaluation decisions taking place in design and in post-occupancy evaluations. The use of Facility Type Information Packages

is not only informational. An FTIP is also a promotional, educational, and evaluatory package.

2. The organization and presentation of information is as important as the information itself.

3. The use of a Facility Type Information Package is part of an evolutionary process and necessary changes may already need to be incorporated.

4. The users of facility type information are different in their educational and social orientation. Any package whose purpose is to transmit information to these users must consider and accomodate these differences.

5. The characteristics of a good method of transmitting facility type information can be divided into five categories--content, communicability, accessibility, evaluation and updating ability, and costs.

a. The contents of a facility type information package should include what is needed by each respective user. It should contain general information for Air Force designers, and criteria for those who evaluate facilities.

b. The communication of facility type information should provide information only as needed, be presented hierarchically, be simple, be prescriptive in nature, and above all use graphics.

- c. The accessibility of information should be related to the frequency of use of the particular information and the time necessary to distribute the required information.
  - d. The evaluation and updating procedure for a facility type information package is necessary for the success of the package. The procedures should be simple and readily accessible to package users.
  - e. The costs of providing information must be analyzed with the benefits of providing the information. If the benefits provide costs savings greater than the information procurement costs, then the proposal is a good investment. The costs of a facility type information package include development, reproduction, delivery, and updating costs. The benefits are decreased time necessary for design, more accurate information, less chance of information deletion, and better evaluation of existing and new facilities on how well they include the requirements of a particular facility type.
6. The use of a facility type information package must be presented in the form of guidelines which state the intended use of the provided information.
7. The development of Facility Type Information Packages (FTIPs) should be organized according to the complexity and people orientation of a facility type. Four categories are suggested which account for these concerns ranging from use

of the old definitive plan concept to the outlining of functional, technical, and behavioral criteria.

8. The Facility Type Information Package that is presented in this thesis is proposed for implementation because of its advantages over the previous methods of transmitting facility type information. Table 5.1 is a reprint of the Chapter IV evaluation of the proposed FTIP. The greater number of criteria met by the use of FTIPs increases the value of a facility type information package.

The eight conclusions listed above are supporting conclusions which led to the development and proposal of the FTIP concept.

Other conclusions were also made during this research effort. The first was that package titles may affect the designer's flexibility in the use of the package. The term "definitive" appears more restrictive than a "guide" or "information package." The variations in the words used in past package titles may indicate the amount of design control wanted by the issuing agent.

Another factor which can influence design flexibility is the wording used in the regulations which refer to the use of facility type information packages. Inconsistency of verbage may mean inconsistency in design flexibility.

The result of this thesis is a proposal for a new package to transmit facility type information. This package is called a Facility Type Information Package (FTIP). This

package recognizes the existence and promotes the use of behavioral factors. These factors, if sufficiently documented in an information package, increase the chances of obtaining good architecture. The architect with behavioral information is better equipped to provide more livable facilities which ultimately impact upon individual productivity.

### Recommendations

The primary recommendation of this report is to implement the proposed Facility Type Information Package (FTIP) concept. It provides more benefits at less cost.

A secondary recommendation is to coordinate all regulations and manuals to ensure consistency in the referral to facility type information packages. Inconsistencies in the referrals to AFM 88-2, Definitive Designs of Air Force Structures, were noted earlier.

It is also recommended that all regulations should contain an index of referenced regulations and manuals. This procedure would allow more complete information gathering and a more accurate and timely updating of ideas referred to in several regulations.

### Recommendations for Further Study

There are several suggested areas which could use further examination or expansion. These are:

1. Distribute and test the effectiveness of the proposed FTIP in the field.
2. Evaluate the effect of the amount and kind of information presented to an AE firm and the subsequent cost of the firm's services.
3. Expand upon the idea of Facility Type Information Categories to include more detailed criteria for categorization and a list of all potential facility types in each category.
4. Provide an example from each of the proposed FTIP categories.
5. Examine the possible statistical methods, such as analysis of semantic differential scales, to evaluate a customer's architectural preferences and evaluate preferences for particular facility types.



Table 5.1

# CRITERIA CHECKLIST

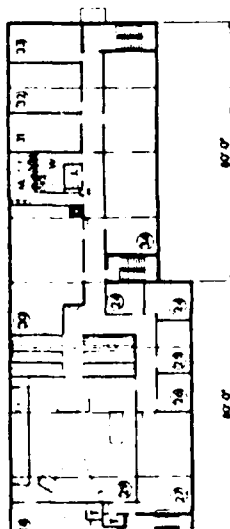
		FTIP	DESIGN GUIDES	BUBBLES	DEFINITIVE
USES	• INFORMATIONAL				
	• PROMOTIONAL				
	• EVALUATORY				
	• EDUCATIONAL				
USERS	• TECHNICAL / NONTECHNICAL				
	• AIR FORCE / NON AIR FORCE				
	• PROGRAMMER'S FORMAT				
	• DESIGNERS FORMAT				
CONTENT	• GUIDELINES FOR CHOOSING FACILITY TYPES				
	• GUIDELINES FOR CHOOSING DETAIL LEVEL				
	• PURPOSE				
	• FUNCTIONAL REQUIREMENTS				
	• SPACE REQUIREMENTS				
	• HEALTH / SAFETY CONSIDERATIONS				
	• GROWTH AND FLEXIBILITY				
	• INTERRELATIONSHIPS OF SPACES				
	• USER IDENTIFICATION AND PATTERNS				
	• COST INFORMATION				
	• EXAMPLE FLOOR PLANS				
	• GUIDE FOR SITE SPECIFIC INFORMATION				
	• GUIDE FOR USER INPUT AND EVALUATION				
	• CRITERIA FOR TECHNICAL EVALUATION				
	• CRITERIA FOR FUNCTIONAL EVALUATION				
	• CRITERIA FOR BEHAVIORAL EVALUATION				
	• TABLE OF CONTENTS				
	• INSTRUCTIONS FOR USE				
	• REFERENCES				
	• PRIORITIZED FORMAT				
	• INDEX OF TERMS				
	• INFORMATION MODULES				
COMMUNICATION	• RELATES TO USERS				
	• INFO GIVEN ONLY AS NEEDED				
	• HIERARCHICAL PRESENTATION				
	• SHORT WORDS AND SENTENCES				
	• STANDARD PAGE LAYOUT				
	• SECTION / TITLE EACH PAGE				
	• STANDARD TOPIC HEADINGS				
	• PRESCRIPTIVE INFORMATION				
	• SEQUENTIAL - IN ORDER OF USE				
	• USE OF GRAPHICS				
	• GRAPHICS RELATED TO TEXT				
ACCESSIBILITY	• LEVEL OF DETAIL BY USER				
	• TIMESPAN - ADEQUATE				
	• FREQUENCY OF USE ACCOUNTED FOR				
EVALUATION AND UPDATE	• PROVISION FOR PACKAGE EVOLUTION				
	• UPDATE PROCESS READILY ACCESSIBLE				
	• SIMPLICITY OF UPDATE				
COSTS	• REDUCTION OF DEVELOPMENT COSTS				
	• REDUCTION OF REPRODUCTION COSTS				
	• REDUCTION OF DELIVERY COSTS				
	• REDUCTION OF UPDATING COSTS				
	• REDUCTION OF AE FEES	?	?	?	?
	• INCREASE IN BENEFIT COSTS RATIO				
	• PACKAGE ADEQUATE BY ITSELF FOR CONGRESS				
	• COST / CRITERIA PROVIDED				
	• REDUCTION OF TOTAL SYSTEM COSTS				
	•				

☒ FULL COMPLIANCE 
 ☐ PARTIAL COMPLIANCE 
 ☐ CRITERIA NOT MET

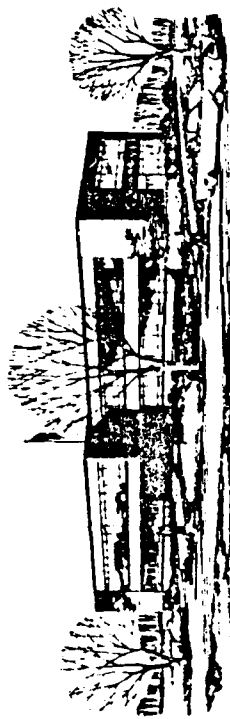
APPENDICES

APPENDIX A

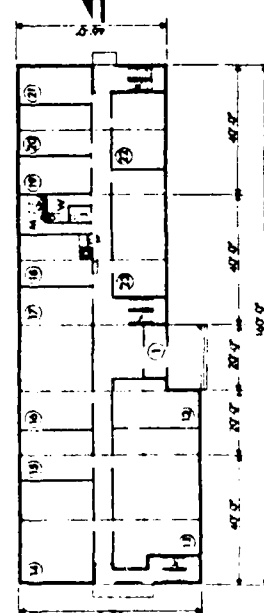
EXAMPLES FROM AFM 88-2: DEFINITIVE DESIGNS  
OF AIR FORCE STRUCTURES



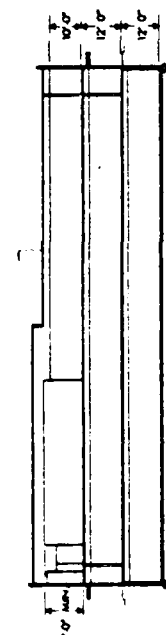
## SECOND FLOOR



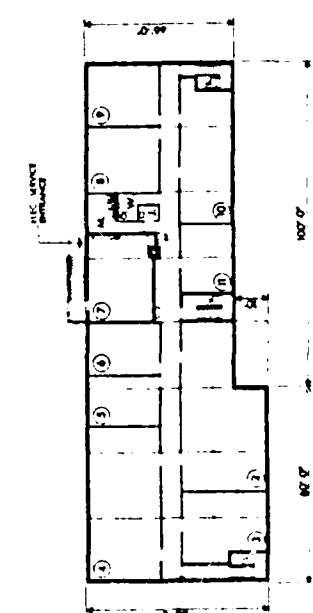
## PERSPECTIVE



**FIRST FLOOR**



**SECTION A-A**



**BASEMENT**

BUILDING TYPE IV

## PROGRAMMING AND PLANNING GUIDES SPECIFICATIONS

THE ALLIANCE BETWEEN THE TWO INSTITUTIONS IS A GOOD ONE AND WILL BE AN ASSET TO THE COUNTRY.

[illegible]

## MECHANICAL REQUIREMENTS

## HEATING

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

AIR CONDITIONING, MECHANICAL VENTILATION  
OR EVAPORATIVE COOLING

14-00000

DATE	TIME	BY	CLASS	ST	LAST NAME
10/1	11:00	10/1	10/1	10/1	10/1
10/2	11:00	10/2	10/2	10/2	10/2
10/3	11:00	10/3	10/3	10/3	10/3
10/4	11:00	10/4	10/4	10/4	10/4
10/5	11:00	10/5	10/5	10/5	10/5
10/6	11:00	10/6	10/6	10/6	10/6
10/7	11:00	10/7	10/7	10/7	10/7
10/8	11:00	10/8	10/8	10/8	10/8
10/9	11:00	10/9	10/9	10/9	10/9
10/10	11:00	10/10	10/10	10/10	10/10
10/11	11:00	10/11	10/11	10/11	10/11
10/12	11:00	10/12	10/12	10/12	10/12
10/13	11:00	10/13	10/13	10/13	10/13
10/14	11:00	10/14	10/14	10/14	10/14
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10/27	11:00	10/27	10/27	10/27	10/27
10/28	11:00	10/28	10/28	10/28	10/28
10/29	11:00	10/29	10/29	10/29	10/29
10/30	11:00	10/30	10/30	10/30	10/30
10/31	11:00	10/31	10/31	10/31	10/31

# ALBA FOR PROGRAMMING

GROSS AREA	
TYPE I	[2,600 SQ FT]
TYPE II	[2,300 SQ FT]
TYPE III	[3,500 SQ FT]
TYPE IV	[2,300 SQ FT]
TYPE V	[2,700 SQ FT]
TYPE VI	[3,500 SQ FT]

GENERAL NOTES

On 14 Oct 1968, the first of three ground water samples was taken from a well about 100 ft from the shore. The water was clear and had a pH of 7.5. The second sample was taken from a well about 200 ft from the shore. The water was clear and had a pH of 7.5. The third sample was taken from a well about 300 ft from the shore. The water was clear and had a pH of 7.5. The water samples were analyzed for various parameters including pH, temperature, and conductivity. The results of the analysis are shown in Table 1.

## DRAWING INDEX

[illegible]

DAY CODE 48-48

[illegible]

## DEPARTMENT OF THE AIR FORCE

**MALGAUGHAN AND JOHNSON**  
JULY 17, 1968  
RE MAILING JULY 11/78 at #102

## HEADQUARTERS BUILDINGS

**TYPES I, II, III, IV, V & VI  
PLAN TYPE V & GUIDES**

**AD 30-02-63**











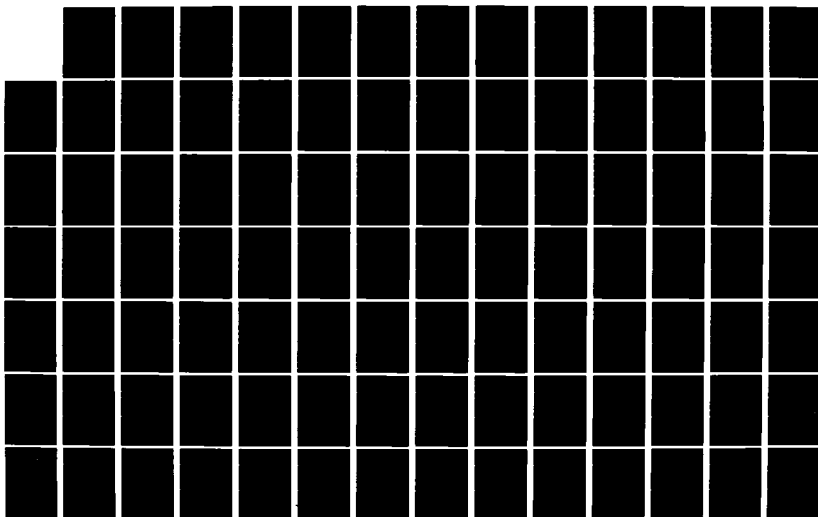
AD-A125 381

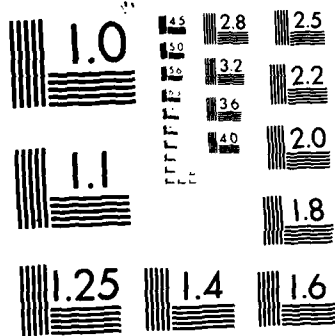
DEVELOPMENT OF FACILITY TYPE INFORMATION PACKAGES FOR  
DESIGN OF AIR FORCE. (U) AIR FORCE INST OF TECH  
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. C D BASHAM  
MAR 83 AFIT-LSSR-83-82 F/G 5/1

3/4

UNCLASSIFIED

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A

SHOWN ACTUAL SIZE

R C O M	BASIC OCCUPANCY FACTOR	C R I T E R I A		D E S I G N		D A T A		S
		DESIGN FACTOR	SOURCE	MINIMUM NET DIMENSIONS	CLASS ROT SECS	DIMENSIONS OF INTERIO.	THIS PLAN SQ. FT.	
CONF. ROOM OFF. SEC.	PERSON	DESK, 2 CHAIRS, 1 BUL- LET IN BOARD	USAF STD		0' 0"	SEE PLAN	81	
TOILET	1 WC, 1 LAV, 1 MEDICINE CABINET	OPERATIONAL REQUIREMENT	DESIGN STD		0' 0"	5' 6" x 6' 6"	36	
GUARD ROOM	PERSON	BED, 1 CHAIR	USAF STD		0' 0"	6' 6" x 6' 6"	36	
GUARD CONTROL	PERSON	1 CONTROL PLATFORM, 1 BUL- LET IN BOARD, 1 SET CAB- INET	USAF STD		10' 0"	SEE PLAN	81	
CORRIDOR	CIRCULATION	OPERATIONAL REQUIREMENT	DESIGN STD		0' 0"	4' 6" x 20' 0"	90	
OFFICE	2 PERSONS	2 DESKS, 2 CHAIRS, 1 FILE CABINET	USAF STD		0' 0"	SEE PLAN	123	
SUPPLY ROOM	STORAGE FOR HOUSEKEEPING ITEMS AND PRISONER'S CLOTHING	SHELVING, CLOTHES HANGERS	USAF STD		0' 0"	10' 0" x 11' 0"	110	
CELL BLOCK	CIRCULATION AND CONTROL	1 SHOWER	USAF STD		0' 0"	5' 6" x 11' 0"	63	
CELL 1	1 PERSON	BED, COMBINATION LAVATORY AND WC	USAF STD		0' 0"	SEE PLAN	66	
CELL 2	1 PERSON	BED, COMBINATION LAVATORY AND WC	USAF STD		0' 0"	SEE PLAN	66	
DORM 1	4 PERSONS	4 BEDS, 1 LAV, 1 WC, 1 UP AND SHOWER	USAF STD		10' 0"	10' 0" x 10' 0"	256	
DORM 2	4 PERSONS	4 BEDS, 1 LAV, 1 WC, 1 UP AND SHOWER	USAF STD		10' 0"	10' 0" x 10' 0"	256	
DORM 3	4 PERSONS	4 BEDS, 1 LAV, 1 WC, 1 UP AND SHOWER	USAF STD		10' 0"	10' 0" x 9' 0"	200	
DAY ROOM	RECREATION, STUDY, EATING	DRINKING FOUNTAIN, BOOK & MAGAZINE RACK, 2 P.O. BENCHES, 6 ASSIGNMENT DESKS	USAF STD		0' 0"	SEE PLAN	232	
LAUNDRY	1 PAID LAUNDRY TRAYS, 1 SERVICE SIGN	OPERATIONAL REQUIREMENT	USAF STD		10' 0"	4' 0" x 6' 0"	96	
HEATER AND J.L. TO ROOM	EQUIPMENT	OPERATIONAL REQUIREMENT	USAF STD		10' 0"	10' 0" x 10' 0"	100	
TOOL ROOM	STORAGE FOR MAINTENANCE EQUIPMENT	OPERATIONAL REQUIREMENT	USAF STD		0' 0"	1' 0" x 10' 0"	30	

CODE

CV - COLD WATER  
CD - CONNECTED DRAINS  
FL - FLUORESCENT LIGHTING

NOTICE LEGIBILITY EVEN AT FULL SIZE. THIS  
INCREASES THE POTENTIAL FOR ERROR.

Copy available to DTC does not  
permit fully legible reproduction

CONTINUED ON NEXT PAGE

CONTINUED FROM LAST PAGE

ANALYSIS							REMARKS AND ADDITIONAL REQUIREMENTS
ITEM	PLAN	LIVE LOADS	ELECTRICAL	MECHANICAL	PLUMBING	HEATING AND VENTILATION	
21			30 FL	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
22			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
23			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
24			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
25			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	PROVIDE COUNTER WITH SINKS BELOW FOR PRISONER'S PERSONAL PROPERTY AND 10" X 8" PASS DOOR WITH LOCK IN VISE FROM ABOVE COUNTER
26			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	INCLUDES BALLY PORT
27			30 FL	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	6 DO FT CLOSET W/DOOR & CLOTHES HANG
28			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	PROVIDE 24" X 24" PASS THRU WINDOW TO DAY ROOM WITH ONE S-SIDED EXPANDED METAL PANEL & 1 HINGED SOLID PANEL
29			10	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	
30			10	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	WINDOW SHALL HAVE OBSCURE GLASS
31			10	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	
32			30 FL	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	PROVIDE SHELVING FOR TOILET ARTICLES
33			30 FL	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	PROVIDE SHELVING FOR TOILET ARTICLES
34			30 FL	NONE	10 AIR CHANGES/HR	NO CRITICAL POINTS	PROVIDE SHELVING FOR TOILET ARTICLES
35			30 FL	DRINKING FOUNTAIN CH - CD	10 AIR CHANGES/HR	NO CRITICAL POINTS	PROVIDE LETTER DROP TO GUARD CONTROL ROOM
36			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
37			30	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	
38			10	NONE	NO CRITICAL POINTS	NO CRITICAL POINTS	PROVIDE SHELVING

## REFERENCE MATERIAL

THE FOLLOWING DOCUMENTS HAVE BEEN USED IN THE DEVELOPMENT OF THIS DESIGN.

### DESCRIPTION

1. USAR, DETAIL, ON FAC. 1, 11
2. STANDARD OUTLINE SPEC. FOR AF FAC. 1, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
3. DEFENSEIVE DESIGN OF AIR FORCE STRUCTURES AFN 50-1

NOTE: USE CURRENT REV. 50-1 TO REFERENCE MATERIAL

### DESIGN GUIDES

#### ARCHITECTURAL

THE PERSPECTIVE AND CATER TO THIS DESIGN IS NOT INTENDED TO ESTABLISH ARCHITECTURAL DESIGN TREATMENT FOR THE FACILITY. THE ARCHITECTURAL DESIGN SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DESIGN MANUAL, AFN 50-1, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

PROVIDE METAL REMOVABLE PANELS FOR ACCESS TO ALL PLUMBING FITTINGS AND FITTINGS AND PIPE CLEAN-OUTS IN CONFINEMENT AREA.

FOR FURTHER ARCHITECTURAL GUIDANCE REFER TO "FOREWORD", AFN 50-1 AND 50-2 AND 50-3 APPLICABLE SECTIONS.

#### STRUCTURAL

DIMENSIONS MAY BE ADJUSTED FOR STRUCTURAL ADAPTATION TO LIVE LOADS SHALL BE IN ACCORDANCE WITH PART IV, CHAPTER 1 OF THE DCE ENGINEERING MANUAL.

#### ELECTRICAL

LIGHTING INTENSITIES SHOWN ARE AT WORKING LEVEL. THE SUGGESTED NUMBER OF CONVEYOR OUTLETS, ROOM IS TABULATED AND THE LOCATION SHALL BE DETERMINED BY THE DESIGNER. THE DESIGNER SHALL BE RESPONSIBLE FOR THE LOCATION OF THE LIGHTING FIXTURES. THE LIGHTING FIXTURES IN CELL SHALL BE CEILING MOUNTED FLUORESCENT TYPE. LIGHTING FIXTURES IN CORRIDOR SHALL BE WALL MOUNTED FLUORESCENT TYPE. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH AFN 50-1.

#### MECHANICAL

HEATING AND MECHANICAL VENTILATION WILL BE IN ACCORDANCE WITH CURRENT 50-1 AND AFN 50-1.

#### PLUMBING

PLUMBING FIXTURES IN CONFINEMENT AREAS SHALL BE OF CAST METAL AND HAVE SMOOTH BOWNE EDGES. SUPPLY FITTINGS SHALL BE CONCEALED AND TAMPER-PROOF WITH UNDER PUSH BUTTONS. LAVATORY SHALL HAVE INTEGRAL TOOTH BRUSH HOLDERS. INTEGRAL HOT AND COLD WATER OUTLETS, BUBBLERS, SOAP DISPENSER AND OVERFLOW CLOSURES SHALL BE BLOWN-UP METAL. INTEGRAL, SEAT AND CONCEALED INTEGRAL WATER INLET SPUD AND OUTLET FLANGE.

SHOWERS SHALL BE BUILT-IN METAL STALLS WITH CONCEALED AND TAMPER-PROOF SUPPLY FITTINGS, SURFACE MOUNTED FIXED POSITION TYPE SHOWER HEAD AND SHOWER POOF HOT AND COLD WATER VALVES.

URINALS SHALL BE PERISTALTIC TYPE, VALVE OPERATED, AND SHALL HAVE CONCEALED SUPPLY FITTINGS AND INTEGRAL WATER INLET SPUD AND OUTLET FLANGE.

SEGREGATED CELLS SHALL HAVE CAST METAL COMBINATION WATER CLOSURE AND LAVATORY. LAVATORY SHALL BE BLOWN-UP METAL WITH BLOW DRAIN TO CLOSET DOWN, AND SHALL BE EQUIPPED WITH SELF-CLOSING TAMPER-PROOF VALVES, UNDER BUTTONS, SOAP DISPENSER, BUBBLER, OVERFLOW AND TOOTHBRUSH HOLDER.

#### DOOR SCHEDULE

ALL DOORS IN EXPANDED METAL PARTITIONS AND SLIDING DOOR BETWEEN DAY ROOM AND CELL BLOCK SHALL HAVE HEAVY METAL SLIDING DOOR WITH STRAP METAL, 10" X 10" X 1/2" TEMPERED GLASS OBSERVATION WINDOW. HINGED DOOR TO CELL BLOCK SHALL BE HEAVY METAL WITH 10" X 10" TEMPERED GLASS OBSERVATION WINDOW. ALL OTHER DOORS SHALL BE HEAVY METAL WITH STRAP METAL. ALL DOORS IN AND LEADING TO THE CONFINEMENT AREA SHALL HAVE HEAVY METAL TYPE HINGED DOORS. DOORS BETWEEN DAY ROOM AND EXTENDED DAY ROOM AND BALLY PORT, BALLY PORT AND CORRIDOR AND EXTENDED DAY ROOM AND EXTENDED DAY ROOM SHALL BE HEAVY METAL TYPE HINGED DOORS. ALL DOORS SHALL HAVE BUILT-IN METAL JAMBS AND EXTERIOR DOORS SHALL HAVE GLASS PANELS.

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DESIGN	REVISION	DESCRIPTION	DATE
DEPARTMENT OF THE AIR FORCE			
HEADQUARTERS UNITED STATES AIR FORCE			
DANIEL MANN JOHNSON & MENDENHALL			
ARCHITECTS - ENGINEERS - LOS ANGELES, CALIFORNIA			
CONFINEMENT FACILITY			
12 MEN			
DESIGN DATA & ANALYSIS			
APPROVED	AD 27-02-33		
FOR CHIEF OF STAFF	SCALE	DATE	SHEET
10/15	1/2" = 1'-0"	16 JULY 1954	2 OF 2

APPENDIX B  
LETTER FROM MR. BILL BROWN

13 AUG 1982

Lt Chris Basham  
112 Iroquois Avenue  
Dayton, Ohio 45405

Dear Lt Basham

The Air Force is currently searching for a method to transmit design data previously conveyed through the Definitive Drawings (AFM 88-2). A better communicator of design data is required in order to alleviate general problems inherent in the current process and procedures. These include but are not limited to; a very high cost to develop, deliver and update AFM 88-2, and the perception by most designers that definitives must be followed completely without any deviation or alteration to accommodate site specific requirements.

With regards to costs, AFM 88-2 is the most expensive document produced by the Air Force . The average cost per sheet in 1982 dollars is \$6,000. These costs include procuring the services of an architect-engineer firm to develop and design the facility (concept design) and provide the Air Force with a finished 30 inch by 40 inch drawing. It does not include the cost of reducing this drawing via contract to a 11 inch by 15 inch reproducible by ozalid process paper and the distribution of the document as well as the cost for salaries etc of Air Force personnel involved in the process. If the size of the drawings could be reduced to a standard 8X11 inch size the cost could be greatly reduced. Accomplishing this would required a complete analysis of the definitive program including an indepth look at the kinds of data being presented. As currently structured the original 30 inch by 40 inch drawings are not legible when reduced to a 8X11 inch size.

With regards to designer perceptions, despite strong wording in the manual that the drawings are for general guidance only, approximately eight out of every ten facilities designed via AFM 88-2 are almost identical. This has occurred despite the fact that eight out of the ten sites were not identical along with differences in Base architectural style, etc. The goal of AFM 88-2 has been to provide basic design data concerning how a facility functions and to provide the designer with a vocabulary of data to use in designing this type of facility for a specific site.

Efforts to resolve some of the issues outlined above have progressed from the use of bubble diagrams to our current efforts to develop design guides. These efforts have met with limited success while at the same time new problems have surfaced.

Bubble diagrams have communicated more design flexibility by not using hardline floor plans and have also yielded less development and delivery costs due to decreased sheet size. Unfortunately use of these diagrams by the field has revealed that while this approach is adequate for conveying design requirements to technical personnel it is totally inadequate as a vehicle for selling non technical personnel on the need for a facility. In particular, it is very difficult to brief a wing commander on a facility when graphically all that can be shown to this individual is a series of circles (bubbles).

Design guides our latest efforts are currently being tested in the field and hopefully will alleviate some of the past problems. Attached is an example of one of these guides.

While it is hopeful that the design guides will improve our current system of conveying design data, this approach is new and as such is untested. Additionally an analysis needs to be made of the definitive program which will define the purpose, the ultimate objective and suggest means of bridging this gap. Any research which you can initiate on how best to communicate facility type information considering the development costs, delivery, and update would be beneficial and appreciated.

Sincerely

WILLIAM A. BROWN  
Chief, Arch and Eng'g Branch  
Engineering and Construction Division  
Directorate of Engineering and Services

1 Atch  
Design Guide

APPENDIX C

LISTING OF FACILITY TYPES AND SCOPES  
IN AFM 88-2: DEFINITIVE DESIGNS OF  
AIR FORCE STRUCTURES



PROPOSED  
FTIP  
CATEGORY

AFM 88-2

	FACILITY	SCOPE*
2	Admin Base Supply, Type A . . . . .	7,920
	Admin Base Supply, Type B . . . . .	11,520
	Admin Base Supply, Type C . . . . .	15,840
	Admin Base Supply, Type D . . . . .	19,440
1	Aircraft Barrier, Runway Overrun	
	A/C Corrosion Control, Covered . . . . .	38,190
2 or 3	Aircraft Maint Shop, Field (General Purpose)	20,110
	Aircraft Maint Shop, General Purpose (Multi-Function) . . . . .	27,085
	Aircraft Maint Shop, Organizational, Type A	2,500
	Aircraft Maint Shop, Organizational, Type B	3,300
	Aircraft Maint Shop, Organizational, Type C	5,700
	Aircraft Maint Shop, Organizational, Type D	8,100
	Aircraft Maint Shop, Organizational, Type E	10,220
	Aircraft Maint Shop, Organizational, Type F	14,700
	Air Navigational Aids, Class "B" VOR (TVOR) . . . . .	
	Air Navigational Aids, Mobile Tacan	
	Air Navigational Aids, VHF-OMNI-Range, AN/FRN-12A (Addn) Types A&B . . . . .	--
	Air Navigational Aids, VHF-OMNI-Range, AN/FRN-12A (Counterpoise) . . . . .	--
3	Air Police Control and Identification, Type A	600
	Air Police Control and Identification, Type B	900
	Air Police Hdqtrs Base Unit (Opns), Type I	2,650
	Air Police Hdqtrs Base Unit (Opns), Type II	3,000
	Air Police Hdqtrs Base Unit (Opns), Type III	3,500
2	Air Police Station (Security Force) . . . . .	1,270
	Alert Aircraft Shelter Area Echelon Arrange	
1	Ammo Maint. Shop . . . . .	2,370
	Ammo Storage Area (ADC Type) (3/Shts)	
	Ammo Storage Area (Sac Type) (1/Sht)	
	Ammo Storage Base (Above Ground) Type A	1,800
	Ammo Storage Base (Above Ground) Type B	5,500
	Ammo Storage Base (Above Ground) Type C	6,600
	Ammo Storage Base Multi-Cubicle Magazine, Type I (SAC). . . . .	4,157
	Ammo Storage Base Seg. Mag., 3 Bay . . . . .	205
	Ammo Storage Base Seg. Mag., 6 Bay . . . . .	410
	Ammo Storage Base Seg. Mag., 8 Bay . . . . .	545
2	Ammo Storage, Site Layout, SAC Type . . . . .	--
	Ammo Storage, Site Layout, Joint SAC-ADC Type . . . . .	--
3	Ammo Storage, Spares, Inert . . . . .	2,500
	Armament & Electronics Shop . . . . . (for F 105 A/C) . . . . .	15,600
3	Armament and Electronics Shop, Type A (SAC) . . . . .	12,650

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
3	Armament and Electronics Shop, Type B (ADC)	12,290
	Armament and Electronics Shop, Type D (SAC)	25,281
	Assembly and Checkout Building	
	Automotive Maintenance Shop, 10-30 Vehicle	
	Equivalents . . . . .	1,485
	Automotive Maintenance Shop, 31-50 Vehicle	
	Equivalents . . . . .	1,875
	Automotive Maintenance Shop, 51-150 Vehicle	
	Equivalents, Type "A" . . . . .	5,500
	Automotive Maintenance Shop, 101-150 Vehicle	
	Equivalents, Type "B" . . . . .	6,800
	Automotive Maintenance Shop, 151-250 Vehicle	
	Equivalents . . . . .	13,330
	Automotive Maintenance Shop, 251-350 Vehicle	
	Equivalents (A&B) . . . . .	19,720
3	Automotive Maintenance Shop, 351-450 Vehicle	
	Equivalents (A&B) . . . . .	23,360
	Automotive Maintenance Shop, 451-650 Vehicle	
	Equivalents (A&B) . . . . .	27,000
	Automotive Maintenance Shop Refueling	
	Units, Scheme A . . . . .	4,500
	Automotive Maintenance Shop, Refueling	
	Units, Scheme B . . . . .	3,600
	Automotive Maintenance Shop, Refueling	
	Units, Scheme C . . . . .	2,700
4	Automotive Storage, Heated (Maint. Garage), 30-500 Vehicles	Varies
	Banking Facilities, Types I Thru V	
	Type I . . . . .	1,280
	Type II . . . . .	1,900
	Type III . . . . .	3,180
	Type IV . . . . .	5,200
2	Type V . . . . .	7,800
	Bowling Alleys 2 Thru 32 Lanes	--
	Blast Deflector, Jet	--
3	Cold Storage, Base (Types A, B, C, D, E, F and G) . . . . .	Varies
	Communications Bldg, Base, Type A . . . . .	6,880
	Communications Bldg, Base, Type B . . . . .	8,050
	Communications Bldg, Base, Type C . . . . .	8,950
4	Communications Bldg, Base, Type D . . . . .	10,410
	Confinement Facility, 12 Men . . . . .	2,470
	Confinement Facility, 15 Men . . . . .	3,460
	Confinement Facility, 20 Men . . . . .	4,400
	Confinement Facility, 32 Men . . . . .	5,740
2	Confinement Facility, 57 Men . . . . .	9,150
	Corrosion Control, A/C . . . . .	38,190

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
4	Confinement Facility, 32 Men . . . . .	5,740
	Confinement Facility, 57 Men . . . . .	9,150
2	Corrosion Control, A/C . . . . .	38,190
	Dining Fac. Enlisted, 500 Mn . . . . .	
4	Dining Fac. Enlisted, 1000 Mn . . . . .	
	Dining Fac, Enlisted, 1500 Mn . . . . .	
1	Dock-A/C Fuel System Maint. -Lg. A/C . . . . .	17,580
	Dock-A/C Maint. Lg. A/C . . . . .	26,790
	Dock-A/C Maint, Small A/C . . . . .	---
	Dormitories, Air Conditioning . . . . .	---
4	Dormitories, Air Conditioning . . . . .	---
	Dormitories, Air Conditioning . . . . .	---
	Education Center . . . . .	6,000
	Ele Emergency Power Bldg, NavAids, Type 1 . . . . .	186
2	Ele Emergency Power Bldg, NavAids, Type 2 . . . . .	295
	Ele Emergency Power Bldg, NavAids, Type 3 . . . . .	403
	Electric Power Bldg. 400/650 KW Unit . . . . .	2,700
	Engine Inspection and Repair Shop, Scheme JA . . . . .	6,800
	Engine Inspection and Repair Shop Scheme JB . . . . .	11,020
3	Engine Inspection and Repair Shop, Scheme JC . . . . .	15,640
	Engine Inspection and Repair Shop, Scheme RA . . . . .	7,000
	Engine Inspection and Repair Shop, Scheme RB . . . . .	15,640
	Engine Inspection and Repair Shop, Combin- ation 1 (RA and JC) . . . . .	21,630
	Engine Inspection and Repair Shop, Combin- ation 2 (RA and JB) . . . . .	17,800
	Engine Inspection and Repair Shop, Combin- ation 3 (RB and JA) . . . . .	20,280
	Fire Station, Bldg. Type A (2 Stalls) . . . . .	4,582
	Fire Station, Bldg, Type A (3 Stalls) . . . . .	5,510
3	Fire Station, Bldg, Type A (4 Stalls) . . . . .	6,438
	Fire Station, Bldg, Type A (5 Stalls) . . . . .	8,410
	Fire Station, Bldg, Type A (6 Stalls) . . . . .	9,686
	Fire Station, Bldg. Type A (7 Stalls) . . . . .	10,614
	Fire Station, Bldg. Type A (8 Stalls) . . . . .	12,122
	Fire Station, Bldg. Type A (9 Stalls) . . . . .	13,050
	Fire Station, Bldg. Type A (10 Stalls) . . . . .	13,975
	1000" Firing-In-Butt, Type A (Semi- Inclosed) Type B (Open) . . . . .	--
3	Flight Simulator Trng., Bomber and Cargo Type A/C, 1 Simulator . . . . .	4,897

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
2OR3	Flight Simulator Trng., Bomber and Cargo Type A/C, 2 Simulators . . . . .	8,368
	Flight Simulator Trng., Bomber and Cargo Type A/C, 3 Simulators . . . . .	11,874
	Flt Simulator Trng., RB-66B or B-47B, 1 Simulator . . . . .	4,413
	Flt Simulator Trng., RB-66B or B-47B, 2 Simulators . . . . .	7,411
	Flt Simulator Trng., RB-66B or B-47B 3 Simulators . . . . .	10,433
	Flt Simulator Trng., Fighter Type A/C, -1 Simulator . . . . .	5,733
	Flt Simulator Trng., Fighter Type A/C, -2 Simulators . . . . .	10,040
	Flt Simulator Trng., Fighter Type A/C, -3 Simulators . . . . .	14,206
	Flight Training, Basic . . . . .	29,600
	Gate House . . . . .	--
	Ground Powered Equipment (Maint.) Shop . . . . .	5,720
	Guard House Security . . . . .	737
4	Gymnasium . . . . .	11,000
	Gymnasium . . . . .	21,000
2	Gymnasium and Pool w/Combined Locker Room (See Sht 4) of AD 31-06-18)	35,300
	Hangar, A/C Maint. Field . . . . .	66,849
	Hangar, A/C Maint. Field, w/leanto . . . . .	77,212
	Hangar, A/C Maint. (Organizational Pull- Thru), w/o Shops . . . . .	28,913
	Hangar, A/C Maint. (Organizational Pull- Thru), Shops Only Both Sides . . . . .	12,416
	Hangar, A/C Maint. (Organizational Pull- Thru), w/Shops One Side . . . . .	35,865
	Hangar, A/C Maint. (Organizational Pull- Thru), w/Shops Both Sides . . . . .	41,329
	Hangar, Alert (Fighter A/C) . . . . .	22,440
4	Headquarters Bldg, Type I . . . . .	3,680
	Headquarters Bldg, Type II . . . . .	7,360
	Headquarters Bldg, Type III . . . . .	16,560
	Headquarters Bldg, Type IV . . . . .	24,050
	Headquarters Bldg, Type V . . . . .	29,700
	Headquarters Bldg, Type VI . . . . .	36,560
1	Instrument Landing System (ILS) NavAids . . . . .	--
	Igloo, Storage, Type A . . . . .	1,230
	Igloo, Storage, Type B . . . . .	1,920
	Igloo, Storage, Type C . . . . .	2,410
	Igloo, Stg-ADC Type - Primary & Secondary . . . . .	--
	Igloo, Stg-ADC Type - Secondary . . . . .	744
	Igloo, Stg-ADC Type - Primary . . . . .	157

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
1-	Igloo, Storage Steel Arch-Earth Mounded (SAC Type) . . . . .	1,590
1-	Igloo, Storage Steel Arch-Under Pass-Earth Mounded . . . . .	
2-	Kennel, Canine (Support Bldg) . . . . .	420
3 {	Laboratory Precision Measurement, Type A . . . . .	1,792
	Laboratory Precision Measurement, Type B . . . . .	2,640
	Laboratory Precision Measurement, Type C . . . . .	3,488
	Laboratory Precision Measurement, Type D . . . . .	4,336
4-	Library Buildings, Types I Thru IX . . . . .	--
3 {	Liquid Oxygen, Bulk Storage . . . . .	--
	Maintenance Shop - Composite . . . . .	5,260
	Medical Food Inspection Facility . . . . .	1,100
	Mobile Trng. Unit Facility (Detachment) . . . . .	11,340
	Modulator, WX Bldg for AN/CPS-9 . . . . .	344
	Navigational Aids Bldg., Type "0" . . . . .	168
	Navigational Aids Bldg., Type "1" . . . . .	344
	Navigational Aids Bldg., Type "2" . . . . .	452
	Navigational Aids Bldg., Type "3" . . . . .	561
	Navigational Aids Bldg., Type "00" . . . . .	64
	Officers' Qrtrs. Cent. Corr. Plan (40 Officers) . . . . .	18,150
	Officers' Qrtrs. Open Balc. Plan, (40 Officers) . . . . .	16,850
	Officers' Qrtrs. Air Conditioning . . . . .	--
	Open Mess, NCO, 50 to 240 NCO's . . . . .	4,400
	Open Mess, NCO, 251 to 400 NCO . . . . .	6,500
	Open Mess, NCO, 401 to 750 NCO's . . . . .	10,000
	Open Mess, NCO, 751 to 1,500 NCO's . . . . .	14,000
	Open Mess, Officers', 50 to 250 Men . . . . .	6,500
	Open Mess, Officers', 251 to 400 Men . . . . .	10,000
	Open Mess, Officers', 401 to 750 Men . . . . .	14,000
	Open Mess, Officers', 751 to 1,500 Men . . . . .	22,000
	Open Mess, Officers', 1,501 to 3,000 Men . . . . .	27,800
3 {	Operations Bldg (Special), Type 'Q' . . . . .	3,200
	Operations Bldg (Special), Type 'B' . . . . .	2,625
	Operations Bldg (Special), Type 'I' . . . . .	2,550
	Operations Bldg (Special), Type 'R' . . . . .	3,200
2 {	Parachute and Dinghy, Base Shop w/Dinghy . . . . .	
	Shop Unit, Type A . . . . .	6,470
	Parachute and Dinghy, Base Shop w/Dinghy . . . . .	
	Shop Unit, Type B . . . . .	10,700
	Parachute and Dinghy, Base Shop w/Dinghy . . . . .	
	Shop Unit, Type C . . . . .	17,400
	Parachute and Dinghy, Base Shop w/o Dinghy . . . . .	
	Shop Unit, Type A . . . . .	5,510
	Parachute and Dinghy, Base Shop w/o Dinghy . . . . .	
	Shop Unit, Type B . . . . .	8,540
1 {	Parachute and Dinghy, Base Shop w/o Dinghy . . . . .	
	Shop Unit, Type C . . . . .	15,400
	Power Check Pad . . . . .	--
	POL Operations & Quality Control . . . . .	1,600
	Radar Approach Control Facility Bldg., 1 Story . . . . .	6,035

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
2	Radar Approach Control Facility Bldg., 2 Story . . . . .	9,605
	Radar Facilities (FD) AN/FPS-35 and AN/FPS-24 . . . . .	20,175
	Radar Facilities (FD) AN/FPS-7 . . . . .	6,633
	Radar Facilities (FD) AN/FPS-26 . . . . .	6,615
	Radar Facilities (FD) AN/FPS-27 . . . . .	12,292
2	Range, High Power Rifle (50 positions, Outdoor) . . . . .	1,620
	Range, Target, Pistol (100 positions, Outdoor) . . . . .	1,640
	Range, Target, Small Arms (10 positions, Indoor) . . . . .	2,875
	Range, Target, Small Arms, (20 positions, Indoor) . . . . .	5,180
	Range, Target, Small Bore Rifle and Carbine (100 positions, Outdoor) . . . . .	1,740
2 or 3	Readiness Crew . . . . .	26,708
	Refueling Units, Scheme A (Maint. Shop) . . .	3,200
	Refueling Units, Scheme B (Maint. Shop) . . .	2,560
	Refueling Units, Scheme C (Maint. Shop) . . .	1,920
	Rocket Assembly, Base Storage, Unit A . . .	2,305
	Rocket Assembly, Base Storage, Unit B . . .	8,080
	Rocket Assembly, Base Storage, Unit C . . .	9,305
	Rocket Assembly, Base Storage, Unit D . . .	10,385
	Rocket Assembly, Base Storage, Unit E . . .	11,610
	Security Sentry House (Ammo) . . . . .	1,324
4	Service Club—501 to 1,000 Men . . . . .	7,000
	Service Club—1,001 to 2,000 Men . . . . .	12,700
	Service Club—2,001 to 4,000 Men . . . . .	19,800
	Service Club—4001 to 5,000 Men . . . . .	27,720
	Shed, Storage . . . . .	40,000
	Shelter, A/C . . . . .	--
	Shelter, A/C WPNS Calib., (Open Facility) . .	--
	Shelter, A/C WPNS Calib., (Closed Facility) .	--
	Shelter, Fallout . . . . .	1,400
	Special Weapons Training (Tech) (SAC) . . .	3,770
	Squadron Hq Bldg (ADC) NJMDC . . . . .	1,467
	Squadron Operations, Type A, 1/2 Sqdn, KC 135 . . . . .	8,700
3	Squadron Operations, Type B, C-124—C-133 . .	8,400
	Squadron Operations, Type C, Fighter . . . .	5,800
	Squadron Operations, Type D, C-130 . . . .	8,400
	Squadron Operations, Type E, Adv. Trng. Ftr./Interceptor . . . . .	8,400
	Squadron Operations, Type H, 20 KC 135 . . .	12,900
3 or 4	Swimming Pool—Indoor (25-Meter) . . . . .	15,212
	Swimming Pool—Outdoor, 8-Lane, 25-Meter— Bathhouse . . . . .	3,690
	Swimming Pool—Outdoor, 6-Lane, 25-Meter— Bathhouse . . . . .	5,820

PROPOSED  
FTIP  
CATEGORY

	FACILITY	SCOPE*
2	Warehouse, Supplies and Equipment Base, Type A . . . . .	20,905
	Warehouse, Supplies and Equipment Base, Type B . . . . .	41,105
	Warehouse, Supplies and Equipment Base, Type C . . . . .	81,805
	Warehouse, Supplies and Equipment Base, Type D . . . . .	122,505
	Warehouse, Supplies and Equipment Base, Type E . . . . .	163,205
	Warehouse, Supplies and Equipment Base, Type F . . . . .	4,000
	Warehouse, Supplies and Equipment Base, Type G . . . . .	6,000
	Warehouse, Supplies and Equipment Base, Type H . . . . .	8,000
	Warehouse, Supplies and Equipment Base, Type I . . . . .	10,000
	Wash Rack, A/C, Type A . . . . .	4,540SY
	Wash Rack, A/C, Type B . . . . .	2,740SY
	Wash Rack, A/C, Type C . . . . .	803SY
	Wash Rack, A/C, Utilities Control Center . . . . .	240
	Weather Facility, Rawinsonde . . . . .	1,755
	Weather Observation Station (Representative) . . . . .	182
3	Swimming Pool—Outdoor, 10-Lane, 50-Meter—Bathhouse . . . . .	7,020
	Target Intelligence . . . . .	9,445
4	Theater, 350 Seats . . . . .	6,500
	Theater, 500 Seats . . . . .	10,270
	Theater, 750 Seats . . . . .	13,460
	Theater, 1,000 Seats . . . . .	16,700
3	Tower Control . . . . .	1 each
4	Trailer Court Fac. (Site and Community Bldg., Perm., 50 Spaces) . . . . .	1,775
2 or 3	Transmitter-Receiver Bldg., 30 KW Gen. Rm. . . . .	1,150
	Transmitter-Receiver Bldg., 60 KW Gen. Rm. . . . .	1,200
	Transmitter-Receiver Bldg., 150 KW Gen. Rm. . . . .	1,265
	Transmitter-Receiver Bldg., Type A, 1 Gen . . . . .	1,060
	Transmitter-Receiver Bldg., Type A, 2 Gen . . . . .	1,190
	Transmitter-Receiver Bldg., Type A, 3 Gen . . . . .	1,325
	Transmitter-Receiver Bldg., Type B, 1 Gen . . . . .	1,320
	Transmitter-Receiver Bldg., Type B, 2 Gen . . . . .	1,450
	Transmitter-Receiver Bldg., Type B, 3 Gen . . . . .	1,585
	Transmitter-Receiver Bldg., Ground/Air . . . . .	2,800
2	Tropospheric Scatter, 1 KW Station . . . . .	3,660
	Tropospheric Scatter, 10 KW Station . . . . .	4,076
	Tropospheric Scatter, 50 KW Station . . . . .	4,874
	Tropospheric Scatter, 10 KW Station . . . . .	4,076
	Tropospheric Scatter, 50 KW Station . . . . .	4,874

\*All scopes in square feet unless otherwise noted.

APPENDIX D  
EXAMPLES OF BUBBLE DIAGRAMS



# COMMUNITY CENTERS

## GENERAL NOTES

1. The community center is a place where the community can meet and discuss its problems and needs. It is a place where the community can plan for its future and work for its improvement. The community center is a place where the community can find help and support in its time of need. It is a place where the community can learn and grow together.
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## ARCHITECTURAL PLANNING

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## DEPARTMENT OF THE AIR FORCE

LEWIS AND CLARK ASSOCIATES, INC.

COMMUNITY CENTER COMPLEX

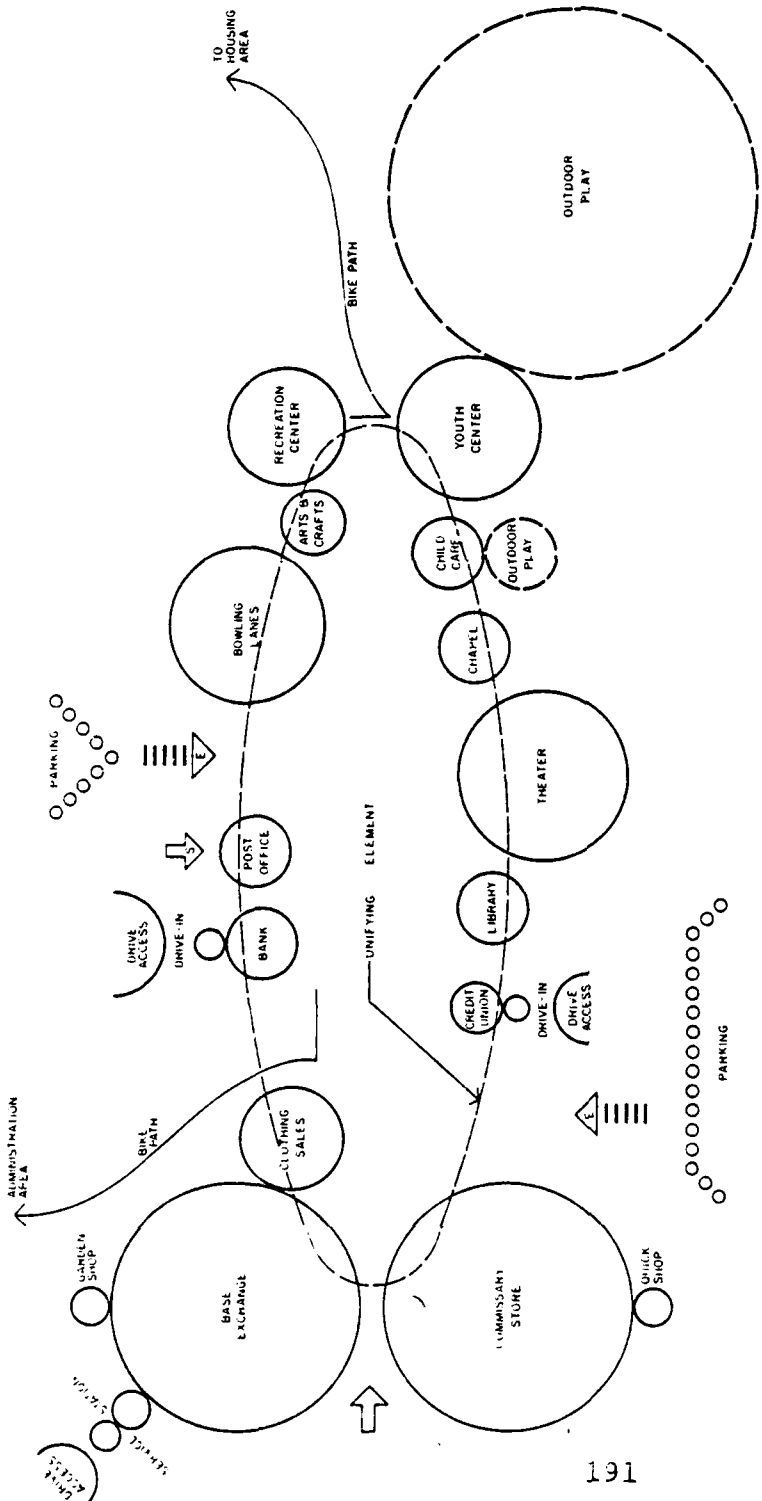
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DATE: 10/1/68

PROJECT: 1 of 2

APPROVED: [Signature]

DATE: 10/1/68



## FUNCTIONAL

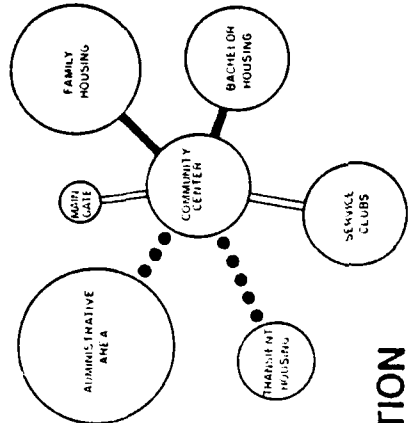
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## FACILITY SCHEDULE

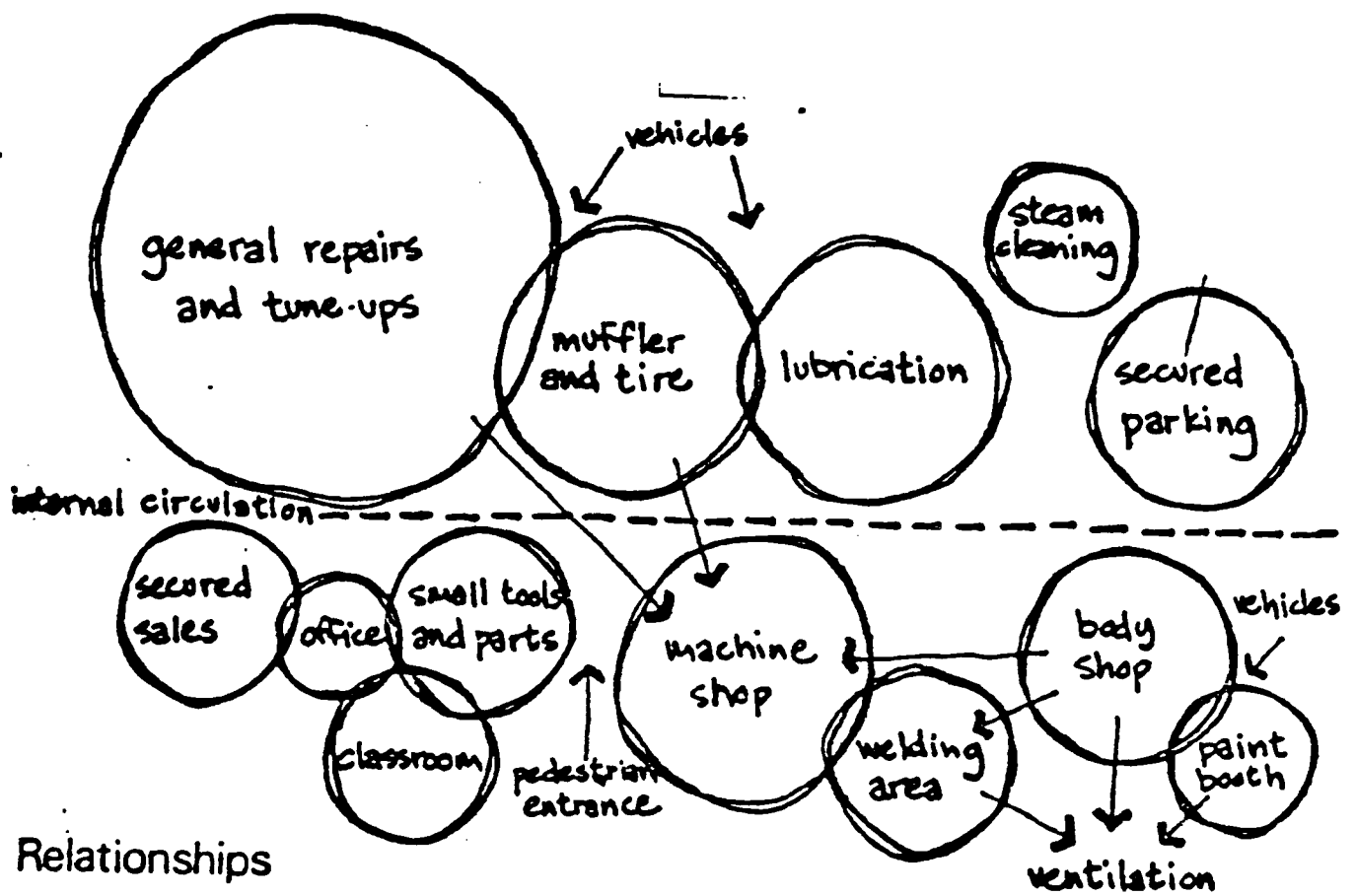
FACILITY	SIZE	RANGE-GSF	REMARKS
<b>MERCHANDISING</b>			
Base Exchange	10,000	10,000	NOTE 1, 2, 3
Unimass Store	10,000	10,000	NOTE 1, 2, 3
Clothing Sales	1,000	1,000	NOTE 1, 2, 3
Post Office	1,000	1,000	NOTE 1, 2, 3
Bank	1,000	1,000	NOTE 1, 2, 3
<b>SERVICES</b>			
Library	1,000	1,000	NOTE 1, 2, 3
Theater	10,000	10,000	NOTE 1, 2, 3
Youth Center	1,000	1,000	NOTE 1, 2, 3
Recreation Center	1,000	1,000	NOTE 1, 2, 3
Outdoor Play	1,000	1,000	NOTE 1, 2, 3
<b>RECREATIONAL</b>			
Theater	10,000	10,000	NOTE 1, 2, 3
Youth Center	1,000	1,000	NOTE 1, 2, 3
Recreation Center	1,000	1,000	NOTE 1, 2, 3
Outdoor Play	1,000	1,000	NOTE 1, 2, 3



## LOCATION



### 3. Functional Spaces



APPENDIX E  
EXAMPLE OF A DESIGN GUIDE

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- A. Major Program Determinants and Options (Chart)
- B. Checklist For Local Site Conditions
- C. Recommended Space Allocations for Typical Child Care Centers (Chart)
- D. Additional Activity Area Requirements
- E. Storage Requirements (Chart)
- F. Functional Area Affinity Matrix
- G. Kitchen Major Equipment List (Chart)
- H. Prototype Plans (To be provided at a later date)

## CHAPTER I

### Introduction

A. Purpose. This Design Guide provides the basic criteria to evaluate, plan, program and design child care centers, including new construction, major or minor renovation and changes to existing facilities.

B. References:

1. AFM 86-2, Standard Facility Requirements.
2. AFM 88-10, Water Supply.
3. AFM 88-15, Air Force Design Manual, Criteria and Standards for Air Force Construction.
4. AFP 88-40, Sign Standards.
5. AFP 88-41, Air Force Interior Design Pamphlet.
6. AFR 215-1, Air Force Morale, Welfare and Recreation (MWR) Programs and Activities.
7. AFR 215-27, Child Care Development Program.
8. AFR 216-6, MWR and Transient Billeting, Construction, Architecture, Kitchen and Interior Design Programs.
9. Annual Air Force Pricing Guide.
10. DOD 4270.1M, Construction Criteria Manual.
11. NFPA 54, National Fuel Gas Code.
12. NFPA 70, National Electric Code.
13. NFPA 90A, Air Conditioning Systems.
14. NFPA 90B, Warm Air Heating and Air Conditioning.
15. NFPA 96, Commercial Cooking Equipment, Vapor Removal.
16. NFPA 101, Life Safety Code.
17. USPH, PHS Publication #934, Food Service Sanitation Manual.

C. Scope and Objectives. This document is applicable for all construction projects for child care centers. It applies to all sizes of child care facilities and to the design of both indoor and outdoor spaces. This document is not intended to provide all of the information needed to identify project requirements or

successfully prepare project designs. Additional information shall be obtained from the installation pertaining to the unique requirements of the location.

D. Philosophy.

1. Importance of child care. A child care facility has considerable responsibility in the community. Its role is to offer a developmentally sound program which goes beyond caretaking. The first experiences for young children in group situations should be ones which develop a sense of joy, wonder, and curiosity in the world around them. One of the most important objectives of a good program is to assist children to develop a positive self-concept. When children feel good about what they can do, when they recognize the love and friendship of caregivers and other children, and when they have confidence in themselves, they will be more receptive to other learning opportunities.

2. Child development and child care.

a. Much of the child's development occurs spontaneously from unstructured activities--play where the child is learning and growing from his or her own initiative, exploration, and discovery. Learning also occurs from structured and semi-structured situations. Optimal early childhood development is enhanced by a complementary balance of unstructured play experiences interspersed with structured learning.

b. Child development occurs by adding knowledge or abilities and by passing through a series of stages or major periods of development. Stages evolve in a fixed order of succession and follow an invariant sequence for all children. Each stage is characterized by behavior that is different from that of the preceding stage. Each stage also integrates all behaviors possible at previous stages, consolidates them, and prepares for development toward the next stage.

(1) Infancy, from birth to about 18 months, is the period when rapid changes of a child can be noted in terms of intellectual as well as physical development. This period is characterized by the sequential acquisition of abilities such as locomotion and grasping. An infant's behavior is centered around manipulation of objects and the performance of activities for the simple sensation and pleasure of it.

(2) The change from infancy to toddlerhood, between 18 months and 3 years, is a period when the major signs of development are the increase of physical capabilities, the use of language and the ability to internalize thoughts. During this period, a child establishes walking and running, begins to explore and experiment with the environment, and increases social experiences such as talking and seeking the attention of others. Toddlers begin to develop personality and establish likes and



dislikes. Play for these children is beginning to move into fantasy and parallel play, where although often in groups, toddlers play without much interaction with other children.

(3) The preschool age child, between 3 and 6 years, has increased control of fine motor skills, a large vocabulary, and often engages in cooperative play. Fantasy play, including frequent daydreaming, occupy much time, and ambiguous and nonobjective settings and props offer varied play possibilities.

(4) From about 5 or 6 until 10 to 12 years of age, the school age child is passing through many intellectual, social and emotional changes. The child no longer confuses his or her own viewpoint with that of others and is able to differentiate and coordinate different points of view. The school aged child begins to engage in complex social relationships and to understand rules of games, morality and ethics.

### 3. Range of child care programs.

a. Air Force child care programs accept children from 6 weeks through 10 years of age. Most programs accept children whose parents are not at home before and after school hours or who wish to place children in a situation between school and family-gathering time.

b. There are three basic scheduling patterns:

(1) Children attending for a full day, e.g., as many as 10 hours.

(2) Children attending for part of a day, typically a half day on a regular, scheduled basis.

(3) Children attending on an hourly non-scheduled basis.

c. There are three types of separation and mixing to be considered in the context of child care centers:

(1) The demands of full day, part-day, and hourly children are somewhat different and will require programs, staff, space and entries for scheduled care versus hourly care.

(2) The need to provide somewhat separate spaces and program options for older versus younger children and also provide opportunities for overlap of different ages with the proper supervision.

(3) School age program should have a separate space with a different character from the rest of the child care operations.

4. Center size. The number of children to be accommodated in one facility is one of the more important decisions to be made when planning and programming child care centers. Maximum center size should be limited to 75 children. When a center is required to serve more than 75 children, use a modular arrangement in the design with the maximum size for each module limited to 75 children. The modules may house either one type of program or one or more programs for a variety of age groups. The modules shall be visually and acoustically separate, however, where feasible, provide proximity and interim circulation between different modules and programs. Provide for support functions such as administrative space, resource library, toy-lending library, space for itinerant staff, centralized bookkeeping, kitchen, receiving in the central core. Provide shared utility walls between modules where feasible.

a. Design the child care centers, based on the following group sizes:

- (1) 0 to 75 children (small)
- (2) 76 to 150 children (medium)
- (3) 151 to 225 children (large)
- (4) 226 to 300 children (outsized)

b. Any request to erect a center to serve more than 300 children will require special attention and shall be handled on a case by case basis.

c. See Appendix H for prototype plans for the different size child care centers. These plans are based on the designs of recent child care centers and are intended to serve a design guidance, not definitive designs.

d. The design of child care centers shall be based on 75 gross SF per child.

5. Outdoor playgrounds. Children's play is critical to psychomotor, intellectual and social development. Adventure play, creative play and environmental play should be emphasized in child care playgrounds.

#### E. Preliminary Planning Guidance.

1. The following chapters discuss the functional and technical requirements essential to the design and construction of child care centers.

2. The appendices at the end of this design guide present additional and more detailed design guidance and equipment lists.

## CHAPTER II

### Architectural

A. Purpose. The primary purpose of child care centers is to serve the developmental needs of children of different ages and cultural backgrounds, and this must be the dominant objective of their architecture.

B. Users. The primary users of the child care centers are:

1. Children:

- a. Early infants (6 weeks to 6 months).
- b. Older infants (6 to 18 months).
- c. Toddlers (18 to 36 months).
- d. Preschool age (3 to 6 years).
- e. School age (6 to 11 years).

2. Staff:

- a. Director.
- b. Desk clerk/receptionist.
- c. Program director/assistant director.
- d. Caregivers.
- e. Food service workers.
- f. Maintenance.

C. General Design Criteria.

1. Architectural style and scale:

a. Design the child care center using an architectural style, choice of materials and color selections that are compatible with the base master plan and the adjacent environment.

b. Design the facility to reflect a residential character by using residential scale doors, windows, roof forms, landscaping and pathways.

c. Keep the ceilings in the activity areas at approximately 10 feet high. If sloped roof shapes are used without dropped ceilings, consider using exposed trusses with the bottom chords held at 10 feet, or banners flags, panels, hanging plants, etc., to create an impression of a 10 feet high space. Hold the ceilings in other areas to 8 or 9 feet high.

d. Use child-scaled materials and equipment whenever possible in the activity areas, toilets and other areas frequented by the children. These child-scaled elements include plumbing fixtures, mirrors, windows, drinking fountains, cubbies, furniture, chalk and bulletin boards, etc. If adult-sized equipment is provided which must be used by the children, make provisions to accommodate this use.

## 2. Entry design:

a. Make the entrance to the building obvious to first time users through the use of signs, overhangs, gates, paths, planting and colors.

b. Provide a covered entryway large enough to serve as an outdoor waiting area. In appropriate climates, extend this roofed area sufficiently to offer protection for two to four cars parked for a few minutes by parents picking up or delivering their children. Provide a minimum of 300 SF for this extended covered space. In calculating the gross footage of the child care center, calculate this area at 50%.

c. Provide views of the interior and outdoor activity areas for the approaching children and parents whenever possible. The design shall be such that children will not have to walk through traffic.

d. Design the pedestrian approach to the building so that the pathway does not pass through any outdoor activity areas. This does not apply to separate front yard or front porch play areas where children can play with their parents upon pickup or delivery.

e. Use elements such as carpeting, warm colors, low level lighting and soft, residential style furniture to provide an inviting and reassuring reception for the children.

f. Design the entry and reception area to permit the parents to meet or say good-bye to their children, help them with their clothes and deliver them to their assigned areas without disruption of the child care center operations.

g. Design the entry to provide the receptionist with a clearly visible, controlled access point.

## 3. Circulation design:

a. Design the circulation paths to be clear to the children, staff and parents. Use colors, textures and finish materials on the walls and/or floors to define traffic patterns. Use signs with words and symbols where appropriate.

b. All circulation paths shall be a minimum of 3 feet in width and shall comply with the fire exit width requirements described in Chapter V, Fire Protection.

c. Calculate the amount of nonassignable space (interior circulation and interior and exterior walls) based on a minimum of 20% of the net assignable space (primary and secondary activity areas, staff, service and 50% of the overhangs at the entry, indoor activity areas, etc.).

#### 4. Activity area design:

a. Provide for both small and large group activity pockets within each age group activity area. Design these activity pockets so that they are open enough to permit children to see the variety of play possibilities available to them, yet provide enough closure to protect the child from noises and visual distractions. See Appendix D for more detailed criteria.

b. Design the activity areas to encourage small group interaction. Provide nooks for two through five children. The maximum size group and the number of staff required for supervision are shown below for the various age groups.

Group	Maximum Size of Group	Staff Required
Early infants (6 wk-6 mo.)	8	2
Older infants (6-18 mo.)	16	2
Toddlers (18-36 mo.)	20	2
Preschool age (3-6 yr.)	24	2
School age (6-11 yr.)	30	2

c. Minimize the number of children to which an individual child is exposed to reduce the spread of disease. The different age groups should not be combined for play activities except in the outdoor play areas or in areas where a minimum of 75 net SF per child is provided.

d. Provide adequate display spaces for children's artwork, bulletin boards, chalkboards and other writing surfaces at children's eye level heights, i.e., 20 to 34 inches high.

e. Use walls for storage and display and to provide visual and tactile stimulation through the use of colors and textures. Half height walls can be used to provide spaces for climbing, seating, plants, puppet stages, etc. Consider the use of glass walls where acoustical but not visual separation is required.

f. Use graphics, murals, display surfaces and shelves to scale walls without textures down to the child scale.

g. Design the floors to be free of drafts and warm to the touch.

h. Select floor finishes that are appropriate for the specific activity pockets, i.e., hard surfaces for wheel toy

play, etc. Choose finishes that resist moisture and minimize maintenance. Use hard surfaces under areas used for eating, painting, water play, etc.

i. Select soft floor coverings which are impervious to bacteria and fungus growth and odor retention.

j. Provide as many soft things in the environment as possible, i.e., floor cushions, carpet, soft furniture, etc.

k. Design modified open space within the activity rooms.

#### 5. Acoustics:

a. Zone quiet activity spaces away from noisy activity areas. Provide an environment which permits sound control.

b. Examine noise relationships between activity areas and provide appropriate acoustic protection where needed. Sounds can be used to heighten interest in activities and to relate activities to space, e.g., a quiet space for resting, an acoustically alive space for physical activity. Certain sounds are comforting and interesting to children while others produce irritation, distraction and fatigue.

(1) The anticipated peak noise level in child care centers is 70-80 dbA. The preferred sound criteria (PNC) should be 35-45 dbA in primary and secondary spaces, less in napping spaces.

(2) Limit the ambient noise level from mechanical systems, outside noises and adjacent spaces to 30-40 dbA.

(3) Limit the reverberation time to 0.6-0.8 seconds generally. Provide less in smaller spaces.

D. Functional Requirements. Provide the following functional spaces. See Appendix C for the total space requirements.

1. Entry/vestible. Provide an entrance vestibule for weather protection. Provide two sets of outward swinging double doors with closers and panic hardware.

2. Lobby. Lobby should be an informal, friendly and home-like area adjacent to the vestibule and reception area. For purposes of control, all child care center activities shall be channeled through this area. Provide ambient lighting of 20 fc with multi-level switching to allow for lighting flexibility.

3. Reception. Provide a reception area adjacent to the lobby. Design the area to convey a sense of partial enclosure, warmth and protection.

a. Provide a receptionist counter/desk to accommodate a cash register or cash drawer, telephone and reception-secretarial-bookkeeping files and equipment. Provide two electrical outlets.

b. Provide for a waiting area for the parents with seating, a coat closet, access to a toilet and space for a pay telephone. (Pay telephone space shall be adequate to accommodate handicapped requirements.) (This space shall be located in the lobby)

c. Provide task lighting of 100 fc over work spaces and ambient lighting of 50 fc elsewhere with multi-level switching to allow for lighting flexibility.

4. Isolation. Provide an isolation room to isolate and observe a sick child. Locate the room adjacent to the reception area and isolated from other children. The desk attendant should be able to supervise, observe and control access to the isolation room without leaving the desk area.

a. Size the room to accommodate a cot or crib.

b. Provide a toilet with a water closet and a lavatory with hot and cold water and a drinking bubbler.

c. Provide a soap/towel dispenser. When used as a combined staff/isolation toilet, a mirror and medicine cabinet shall be provided.

d. Provide 30 fc dimmable incandescent lighting.

e. Provide 10 to 12 air changes per hour.

5. Manager/director's office. Provide a manager/director's office with closet. The director's office and related administrative areas should be visible and accessible to children and parents, provide visual access to the entry area, and maintain visual contact and access to main activity areas.

a. In addition to normal administrative work, the director needs to be readily accessible to staff, children and parents; to have access to indoor and outdoor child activity areas; and to meet with groups of staff, parents and consultants. Design the office to provide for complete visual and acoustical privacy when required.

b. Provide a window and natural ventilation, if possible.

c. Provide a telephone and four standard 115V electrical outlets.

d. Provide ambient lighting of 50 fc and task lighting of 100 fc.

6. Staff. Provide a staff lounge/workroom that is comfortable and buffered visually and acoustically from the activity areas. A staff/public toilet should be nearby.

a. Provide a closet with a hanging rod and shelf for staff garments.

b. Provide 16-24 cubic feet of secured storage for valuables.

c. Provide standard height work counter, storage for equipment (duplicator, typewriter, etc.) and shelving for books and journals. Provide a tackboard for notices.

d. Provide a window and natural ventilation, if possible.

e. Provide a minimum of two 115V electrical outlets, a telephone, an antenna or cable hookup for TV, an electric clock and space for a video-tape machine.

f. Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

7. Staff toilets. Provide toilets for the staff and the general public. (These toilets need not be separated by sex.) Design to accommodate the physically handicapped.

a. Size the number of plumbing fixtures in accordance with AFM 88-8, Chapter 4.

b. Provide water closets and lavatories with hot and cold water (Lavatories may be incorporated into countertops.)

c. Provide mirrors, medicine cabinets and soap/towel/napkin dispensers.

d. Provide a mechanical exhaust fan (two cfm per SF).

e. This area will be shared with other toilets. See section on toilet options.

8. Central Storage. Provide a centrally located general purpose room for storage of books, audio-visual equipment and other resource materials.

a. Size the storage area based on 4 cubic feet per child, but provide a minimum size of 40 SF.

b. Control children's access to materials where necessary with lockable cabinets, etc.

c. See Appendix E for the total storage requirements.

d. Adjustable shelving may be provided.

9. Early infant area. Create a special place with areas for cribs, food warming, storage, diapering, crawling, nursing and



pockets to support activities like looking at books, exploratory play, etc. The early infant area should be separated, but not totally isolated, from the older infant, toddler and preschooler areas. Link the indoor infant area with the outdoor infant activity area.

a. Size the early infant area based on 35 SF of usable space per infant, exclusive of fixed equipment and storage. See Appendix C for the total space requirements.

b. Provide a series of non-hazardous developmentally graded, textured crawling areas with different levels, textures and colors.

(1) Size the textured crawling area based on 5 SF per infant, but provide a minimum size of 50 SF.

(2) Carpet the crawl area.

(3) Limit rises between levels to three to four inches. Construct the level changes using non-permanent construction materials, i.e., carpet covered movable wood platforms or cushions vice poured-in-place concrete.

c. Provide some areas that are walled and create wall areas of tactile and visual interest by using colors, textures, fabrics and carpeting. Locate these interest areas at heights of 6 inches to 20 inches above the floor (or from the eye level of a crawling infant to the average eye level of a standing infant).

d. Provide railings or other support devices to stabilize infant walking efforts in the older infant area only.

e. Provide some uncarpeted areas for wheeled toy activities and for feeding. Size this area to accommodate no more than six high chairs (this should not exceed 65 SF).

f. Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

g. Install all electrical outlets at 54 inches above the floor.

h. Design the diapering area to be efficient, protected from drafts, quiet and intimate. Locate the diapering area adjacent to the sheltered crib area and so that the caregiver can observe other children while diapering.

(1) Size the diapering area based on 2 SF per infant, but provide a minimum size of 15 SF.

(2) Provide a countertop with a sink for diaper changing and infrequent bathing. The countertop should be 34

b. Provide some uncarpeted areas for wheeled toy activities and for feeding. The size of this area shall be 1/3 of the usable room space.

c. Provide clusters of child-size tables and chairs to use for eating and play activities.

d. Provide some wall areas of tactile and visual interest by using colors, textures, fabrics and carpeting. Locate some of these interest areas at heights of approximately 28 inches above the floor (or at the average eye level of a standing toddler).

e. See Appendix E for the storage requirements.

f. Provide the toddler activity area with direct access to the toddler outdoor activity area; this outdoor activity area should be easily accessible to the infant and preschooler (outdoor) activity areas.

g. Provide ambient lighting of 50 fc with multi-level switching to allow for lighting flexibility.

h. Design the diapering area to be efficient, protected from drafts, quiet and intimate. Locate the diapering area adjacent to the sheltered toddler crib area and so that the caregiver can observe other children while diapering.

(1) Size the diapering area based on 1 SF per toddler, but provide a minimum size of 10 SF.

(2) For other requirements, refer to the requirements for the early infants diapering area.

i. Provide a toddler toilet room with space for an adult to assist a child. Provide one child-size water closet per 15 children and space for one potty chair per four children. See the section on Children's Toilets for additional design criteria.

12. Preschooler Area. Provide an environment for the preschool age children with activity areas, storage and a preschooler toilet. Provide activity centers for two to five children for each major activity which is to be a part of the preschooler curriculum, e.g., arts and crafts, nature study, reading, music, etc. See Appendix D for the total activity requirements.

a. Size the preschooler area based on 35 SF of usable space per preschooler, exclusive of fixed equipment, storage and the toilet. See Appendix C for the total space requirements.

b. Provide at least one area for large groups of up to 15 preschoolers. This area will be used for dance and other

inches high, 24 inches to 30 inches deep and a minimum of 60 inches to 72 inches long with a 3 inch to 4 inch raised edge on three sides for safety. Finish all surfaces with self-edging laminated plastic or other similar materials that are washable and warm to the touch. Provide a recessed porcelain sink with hot and cold water controlled by a single mixer faucet.

(3) Provide shelves and storage above and below the diapering surface and/or immediately adjacent to the changing area for diapering supplies and the infants' personal supplies. Provide an enclosed space for a container to hold soiled diapers. See Appendix F for additional storage requirements.

i. Provide space for a food warming area. Provide a self-edging laminated plastic countertop with backsplash, 34 inches high, 24 inches deep and 36 inches to 48 inches long for food preparation and warming.

(1) Provide four 115V electric outlets.

(2) Provide 50 fc task lighting.

(3) Provide space for a small under counter refrigerator.

j. Provide a staff toilet with a water closet and a lavatory with hot and cold water.

(1) Provide a mirror and medicine cabinet.

(2) Provide soap/towel/napkin dispensers.

(3) Provide a mechanical exhaust fan (two cfm per SF).

k. Provide a nursing area with a curtain that can be drawn shut. This area will be used by nursing mothers. It shall be comfortable and quiet and shall not exceed 60 SF.

10. Older infant area. Provide a separate space for the older infants, based on the criteria for the early infant area.

11. Toddler area. Provide a toddler environment with activity areas, storage, diapering area, feeding and a toddler toilet room. Provide activity centers for two to five children for each major activity which is to be a part of the toddler curriculum, e.g., language development, arts and crafts, fantasy play, nature study, group games, reading, music, sand play, physical play, etc. See Appendix D for the total activity requirements.

a. Size the toddler area based on 35 SF of usable space per toddler, exclusive of fixed equipment, storage and the toilet. See Appendix C for the total space requirements.

group activities and should be designed to be easily divided into smaller areas to permit greater use flexibility.

c. Provide the preschool age activity area with direct access to the preschool outdoor activity area.

d. See Appendix E for the storage requirements.

e. Provide a preschooler learning toilet with space for an adult to assist a child. Provide one child-size water closet per 15 children. See the section on Children's Toilet's for additional design criteria.

13. School age area. The multipurpose room shall be used to accommodate the school age children and a separate area shall not be provided. See the requirements for the Dining/Multipurpose Area.

14. Children's toilets. provide toilets easily accessible to the activity spaces and outdoor play spaces. One toilet room shall be shared by two activity spaces (at a minimum). This toilet sharing shall be limited to toddler and preschool areas.

a. The toilets shall be shared by both sexes and shall accommodate the physically handicapped.

b. Use child-scaled fixtures. Provide stools or steps in cases where children must use adult-scale fixtures. One area within toilet room shall be set aside for potty chairs.

c. Provide one water closet per 15 children.

d. Provide one lavatory with hot and cold water per 15 children and locate in activity space for visual control by staff. Limit the water temperature to 110 degrees. Provide a drinking bubbler.

e. Provide easy-access traps for removing towels, toys, etc.

f. Provide toilet paper holders, towel dispensers and paper storage.

g. Provide floor drain and slope floor to drain.

h. Provide seamless wall and floor surfaces which are non-slip, non-abrasive and easily cleaned. Avoid sharp corners and ceramic tile finishes.

i. Design temperatures shall be 68 degrees minimum in the winter and 78 degrees maximum in the summer, measured at a height 1 foot above the floor.

j. Provide a mechanical exhaust fan (two cfm per SF).

15. Dining/multipurpose area. Provide a dining area that shall also serve as a multipurpose area and double function as a space for school age children. The use of this area as a dining space is to be minimized. It is intended that the majority of the feeding occur in the activity rooms. However, this approach is dependent on an individual base's needs and requirements. The space shall be sized as a minimum, either to accommodate the various activities that occur in the multipurpose room or to accommodate the school age children or to feed a certain number of children at a given time, whichever is larger.

a. For school age area, provide a minimum of 35 SF of usable primary activity space per child for reading, music, arts and crafts and nature study. Provide storage for belongings and an unfinished space of 130 SF per 15 children (minimum 9 SF per child).

b. When space is to be used for dining, it shall be sized at a minimum to accommodate 1/3 of the children over 2 years old.

c. Provide a toilet adjacent to the dining/multipurpose area. This toilet will be used by both sexes and shall serve as public/staff toilet.

(1) Size the toilet on the basis of 3 SF per child, but provide a minimum sized area sufficient for one water closet and one lavatory for up to 15 children. The 3 SF rule shall be used for over 15 children.

(2) Size the number of plumbing fixtures in accordance with AFM 88-8, Chapter 4. Provide standard-size fixtures, including water closets and lavatories with hot and cold water.

(3) Provide a mechanical exhaust fan (two cfm per SF).

(4) Provide soap and towel dispensers and mirrors.

d. Provide a drinking fountain.

e. Provide storage for coats and personal belongings. See Appendix E for requirements.

f. Provide a wall-mounted extension phone.

g. Provide task lighting of 20 fc with multi-level switching to allow for lighting flexibility.

h. Provide eight to ten air changes per hour.

16. Kitchen. Provide a kitchen with food preparation and related storage areas. Food preparation and storage should be centrally located and should contain four work centers: receiving, food storage, cooking and clean-up. The four work

stations should be planned so that dry storage and receiving areas are closest to the exterior door while clean-up should be located closest to the serving line and have easy access to the other interior activity areas.

a. Provide space for two 30 by 30 by 48 inch food carts in the receiving area. Provide a telephone and one 115V electrical outlet.

b. Dry food storage:

(1) Design dry food storage with no windows but with adequate ventilation, protected from rodent infestation and lockable. These areas shall not be subjected to freezing, excessive heat or dampness and shall not be used for storage of non-food items such as mops, brooms, etc.

(2) For kitchens serving up to 75 children, provide 45 SF of space with 75 LF of shelving.

(3) For kitchens serving from 76 to 150 children, provide 60 SF of floor space with 150 LF of shelving.

(4) For kitchens serving from 151 to 225 children, provide 80 SF of floor space with 225 LF of shelving.

(5) For kitchens serving from 226 to 300 children, provide 95 SF of floor space with 300 LF of shelving.

(6) Provide 21 inch deep shelving with a minimum 10 inches clear between shelves and with the lowest shelf 6 inches above the floor. If large storage containers for flour, sugar, etc., are to be used, provide a minimum of 36 inches clear between the lowest shelf and the next higher shelf.

(7) Use slotted, louvered or wire construction metal shelving vice solid shelving to provide better air circulation and maintenance. All metal shelving shall have a rust preventative finish and be fabricated in accordance with National Sanitation Foundation standards.

(8) If base cabinets are used for dry storage, provide cabinets 30 to 34 inches high, a minimum of 18 inches deep and with shelving spaced to accommodate no. 10 cans. All door openings shall be a minimum of 12 inches wide.

(9) Provide ambient lighting of 15 fc and 50 fc task lighting over work counters.

(10) Provide a thermometer with a temperature range from minus 20 degrees F to plus 120 degrees F in 2 degree divisions. Control the temperature range in the storage area, however, to between 50 and 70 degrees F.

(11) Provide for relative humidity of 20% with separate controls and a separate thermostat.

(12) Provide four air changes per hour.

c. Cooking and clean-up:

(1) Size the kitchen area based on Appendix C.

(2) Use commercial grade kitchen equipment. See Appendix G for the equipment requirements.

(3) Provide space for a trash container and for the storage of two food carts, 30 inch by 30 inch by 48 inches.

(4) Provide storage for dishes and for clean-up supplies. Keep this storage separate from the dry food storage. It may be in a separate closet or upright cabinets.

(5) Provide ambient lighting of 100 fc.

(6) Provide a separate thermostat for the kitchen and limit the temperature range to between 62 degrees F and the standard temperature levels.

(7) Provide a forced air exhaust with a grease filter.

(8) Provide 10-12 air changes per hour.

(9) See Appendix H for suggested kitchen layouts.

17. Laundry room. Provide a laundry room close to the infants and toddlers activity areas and convenient to the food preparation area. The laundry room shall have adult-controlled access and be isolated from the activity areas as much as possible to minimize noise and safety problems.

a. See Appendix C for the space requirements.

b. Provide one washer and one electric dryer. The equipment shall be commercial grade. Provide a washer plumbing box with hot and cold water faucets and a standpipe for the washer; provide a vent with an easily accessible lint trap for the dryer. Provide 115V and 220V electrical outlets for the washer and dryer, respectively. Provide appropriate connections for gas dryer if applicable.

c. Provide a single compartment laundry tub with hot and cold water.

d. Provide a self-edged laminated plastic countertop, 34 inches high, 24 inches deep and 48 inches to 72 inches long, for

folding laundry, etc. Provide two 115V electric outlets above countertops.

e. Provide secured storage for laundry supplies and open storage for clean and dirty laundry.

f. Provide a floor drain; slope floor to drain.

g. Provision of a thermostat-controlled exhaust fan is optional.

h. Limit the ambient noise level to 50 dbA.

i. Provide three to five air changes per hour.

j. If the need exists for more than one washer and dryer, then the base laundry facilities shall be used.

18. Janitor closet. Provide a janitor closet with a slop sink with hot and cold water and storage for mops, pails, vacuum cleans and related cleaning and maintenance supplies and equipment.

a. Provide approximately 12 SF for storage of one janitor's cart, plus an additional 20 SF supply storage for each 75 children module.

b. Provide open shelving and wall-mounted cabinets to store maintenance-related tools and supplies.

c. Provide keyed locks on the janitor's closet door and on the cabinet doors.

d. Provide a floor drain; slop the floor to the drain.

19. Mechanical equipment room. Provide space for mechanical and electrical equipment. Isolate this space from other spaces as much as possible.

a. See Appendix C for the space requirements. The total mechanical and electrical equipment floor area is not calculated as part of the gross building area.

b. Mechanical equipment room shall open directly to the exterior of the building. Provide double doors.

c. Provide outside air supply and exhaust for the fan room.

d. Provide space for electrical distribution panels.

e. Install sensors and controllers for the EMCs to monitor climate control and the operation of the mechanical equipment; connect to the base master control room equipment, if applicable.



f. All fuel storage shall meet five safety codes.

g. Provide general lighting of 20 fc.

h. Limit the peak noise levels to 85 dbA within the room and to 25 dbA to the administration and activity areas. Minimize vibration transmission to these areas as well.

20. Parent-staff corner. Provide a parent-staff area to accommodate five to seven seated adults. Locate this area adjacent to the administrative area, the staff room and the public toilets.

a. In small centers with a maximum of 75 children, the staff room shall be used for this function.

b. In the larger centers, provide a separate area of approximately 100 SF.

21. Toilet Options. The school age toilets shall be used by staff and public. In centers not serving school age children, the following options shall be used:

a. In centers under 10,000 SF, the isolation toilet shall be used for staff toilet.

b. Staff toilets shall be combined with public toilet in centers over 10,000 SF.

#### E. Construction/Material Selection.

1. Consider the initial cost of construction and the cost of operation, maintenance and custodial care projected over a 25-year life cycle when evaluating building system alternatives during the design development process. Provide an economic analysis for all major building components (foundations, structure, electrical, mechanical, finishes, etc.), and evaluate at least three alternatives when material or system options are available.

2. Select easy maintenance materials to help keep the building looking bright and "new." Finish all interior walls, doors and trim with easily cleaned surfaces such as gloss or semi-gloss epoxy or enamel; consider using darker colors on doors and jambs to mask fingerprints, etc.

3. Hardware. Children will experiment with latches and other hardware in their explorations of the facility. Hardware shall not have sharp edges or protrusions. Consider safety in the selection and placement of hardware.

a. In areas where children should not have access, place locks and bolts out of children's reach.

b. Use hardware for children and adults that is operable from either side and non-locking to prevent small children from getting locked inside a space.

c. If dutch doors are used, the bottom portion may be locked.

4. The use of accordin doors shall not be encouraged during the design process.

F. Design for the Physically Handicapped.

1. All child care centers shall be designed to be barrier-free and accessible to the physically handicapped in accordance with DOD and ANSI criteria.

2. Design the site and the building to permit the physically handicapped persons to act independently and pursue opportunities normally afforded able-bodied persons.

3. Minimize environmental barriers for handicapped children and staff by making movement easy and barrier-free, by locating objects within reach, and by designing the environment to be easily "read."

4. If there are requirements to accommodate severely physically handicapped children into the child care program, contact the Manpower and Personnel Center (HQ AFMPC/MPCSXC) for additional criteria.

## CHAPTER III

### Mechanical

#### A. Heating, Ventilation and Cooling.

##### 1. General.

a. Design the heating, ventilating and air quality systems to be responsive to children's needs. Zone for different comfort needs in different activity spaces.

b. Small children's physiological response to temperature, humidity, and air quality are different from adult needs and will vary according to the level and type of activity. Children spend much time on the floor and near the floor; consider the temperature and air quality at this level.

##### 2. Criteria:

a. Standardize design temperatures in all rooms occupied by children at 68° F. in the winter and no higher than 78° F. in the summer, measured within 1 foot of the floor. Exceptions to this standard are given in appropriate spaces.

b. Zone active spaces for lower temperatures and quieter, sedentary spaces for higher temperatures.

c. Site the building for passive energy conservation, insulate well and design for active solar gain where appropriate.

d. Provide for relative humidity of 40-50% in all spaces used by children.

e. Provide a minimum of 5 cubic feet per minute of outdoor air per occupant, with six to eight air changes per hour, unless otherwise indicated.

f. Provide uniform air velocities of 25-40 feet per minute, 1 foot from the floor, unless otherwise noted.

g. Provide tamper-proof thermostats in all primary and secondary activity spaces, located 36 inches from the floor.

h. Provide mechanical exhausts for all kitchens, toilets, laundries, dining, and food preparation spaces.

#### B. Plumbing.

1. Design the plumbing in child care facilities for easy use by children. Provide individual shut-off valves for each fixture, and floor drains in each area. Fixtures shall be sized for the age group served, except in areas reserved for adults.

2. In addition to bathrooms, provide hot and cold water and wash basins in activity spaces as required.

3. Provide floor drains in all toilets, laundries, janitor closets, kitchens, and water play areas to prevent flooding. Provide deep seal traps in areas that do not normally stay wet.

4. Maximum water temperature should be 110 degrees. Provide appropriate measures in all child accessible areas to prevent children from being exposed to scalding water.

5. Provide drinking fountains in each major care area for children 3 years and older and on the playgrounds.

## CHAPTER IV

### Electrical

#### A. Lighting.

##### 1. General:

a. Combine natural and artificial light to provide adequate task and general lighting which can be modified to respond to changing needs.

b. Daylight from windows and skylights should be used when appropriate.

##### 2. Criteria:

a. Maintain illumination levels at 50 fc for task lighting on all activities requiring perceptual acuity (reading, drawing, color and shape discrimination tasks, staff administration work, testing, etc.) and 30 fc for background lighting and all other activities not requiring close perceptual acuity.

b. Provide brightness ratios of 3:1 between task and background. In addition to controlling artificial lighting ratios, use siting baffles, roof overhangs, shades, etc., to control the natural light brightness ratios. Provide adequate lighting in entry spaces to permit gradual adaptation to outdoor-indoor ratios much greater than the interior.

c. Control lateral differences in illumination, especially those created by strong side natural lighting in an activity space. Use sun shades, light attenuation devices, etc., and orient activity pockets, work surfaces and storage units so that light comes from behind most activities and children.

d. Provide sufficient controls over the natural and artificial lighting sources to give lighting flexibility. Use multi-ballast switches, dimmer switches, track lighting, movable lights, etc.

e. Provide high shielding luminaries with a cutoff angle of about 30° for task lighting areas.

f. Equip child care centers with an internal communications system. Control panel at reception desk with hard-off instruments in all care areas and playground.

g. Provide night lighting in non 24-hour centers in lobby and/or cash areas that are visible from outside.

h. Where fluorescent fixtures are required, use broad spectrum fluorescent lamps. Narrow spectrum fluorescent bulbs are not to be used. Designs shall employ a mix of fluorescent, incandescent and natural lighting.

B. Power.

1. General: Sufficient electrical outlets, out of children's reach should be available throughout all primary and secondary spaces to provide for power and lighting needs.

2. Criteria:

a. Each primary and secondary activity space should have one 115V convenience outlet every 12 feet along perimeter walls.

b. Consider integrating lighting and electrical systems into floor or ceiling grids and into movable working walls to provide future flexibility.

c. Keep all outlets in spaces accessible to children out of their reach. Height of outlets should be minimum 54 inches above finished floor. In child accessible areas where and if necessary to locate receptables lower than 54 inches from finished floor (e.g., 18 inches above finished floor), the receptacles shall have a cover that must be twisted prior to inserting plug.

3. Where necessary, provide pad-mounted exterior transformers in dead front enclosures.

## CHAPTER V

### Fire Protection

#### A. General:

1. When a facility or open space houses more than one age group, the fire protection requirements for the younger children shall apply.

2. Except as noted herein, the requirements of NFPA 101, Life Safety Code (latest edition) apply.

3. Locate all child care facilities on the ground floor regardless of building construction. Separate spaces for school age children may be above the ground level if special construction standards or automatic fire suppression systems are included.

4. Occupant load is based on 35 square feet of net floor area per person.

5. All child care centers shall be of Type N construction.

#### B. Fire Protection Systems:

1. An automatic fire alarm and detection systems (FADS) is required in all areas of the child care center. In sprinklered areas, the sprinkler system serves as the FADS as well as the suppression system.

2. The FADS shall consist of an automatic smoke detection system in all sleeping areas, and an automatic heat detection system in all other areas. All areas except sleeping area that are sprinklered do not require a smoke and heat detection system.

3. All child care centers require an automatic wet or dry pipe sprinkler system in all hazard areas. Hazard areas include kitchens, utility/boiler/mechanical rooms, closets, storage rooms, lounges, offices and laundry rooms.

4. A manual fire and evacuation alarm is required.

5. All FADS must transmit a signal to the fire department serving the center.

6. All facilities that are not single story, slab on grade construction, require total protection with automatic sprinklers.

7. Kitchen range hoods shall be equipped with a dry chemical type automatic extinguishing system when the hood serves a deep fat fryer or open burners.

8. The power supply for fire alarm and detection systems shall be connected in the following manner: Commercial/backup power → battery charger → battery → detection circuit. The system shall operate from battery power constantly, thus eliminating power interruptions.

9. An annunciator panel shall be installed in the main entrance (lobby) area which indicates exact room of alarm. Sprinkler alarm is not required to be distinguished by area/room.

10. Fire department connections to support sprinkler systems shall be accessible. They shall not be located inside fenced areas, or other locations requiring special procedures to gain access.

#### C. Fire Area Separation.

1. Hazard areas shall be separated from the rest of the building by one hour fire rated walls. Walls separating different age groups shall be fire rated for one hour.

2. All doors in fire rated walls shall be self-closing and equipped with automatic hold open devices. Any actuation of the buildings' fire alarm system shall cause all doors to close.

3. Compartmented sleeping areas are required for multi-story centers or centers located above the first floor.

4. Smoke divisions are required at 300 feet intervals.

#### D. Exit Criteria.

1. Provide at least two fire exits from each activity space. One of these exits shall discharge directly to the outside and shall not require travel through any other area to reach the exit discharge. In crib rooms, both exits shall discharge directly to the outside.

2. Circulation paths used as fire exit paths shall be a minimum of four feet wide.

3. Travel distance to exits in modified open plan centers for children three years of age and older shall not exceed 150 feet.

4. Exits from crib rooms shall be sufficient width to accommodate a crib. Hold-open devices are required on these doors. Exits opening above ground level require ramps; these ramps shall be limited to a maximum slope of one foot in 20 feet. Ramps shall not be less in width than the exit door leading to the ramp. Ramps shall have non-slip surface. Ramps exceeding one foot in height at any point shall have guard rails. Ramps shall have a maximum 30 feet run to landings.



5. Panic hardware is required on all exit doors.
6. Backup generators are recommended for all child care facilities to operate lighting during power failure.
7. Where backup generators are not provided, other emergency lighting is required in all means of egress.
8. Fences shall be provided with gates.
9. All fenced areas shall include gates which will permit occupant egress/removal to an open area.
10. Doors shall swing in the direction of exit travel.

E. Interior Finishes.

1. Interior finishing materials shall be class A only. All materials shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less (ASTM E-84 Test).
2. Carpet shall comply with the requirements of AFM 88-15. Carpet used in the vertical position shall be considered as interior finishing material and shall meet the requirements of E1 above.
3. Special protective electrical receptacle covers shall be installed in all areas occupied by children under 5 years of age.

F. Water Supply and Fire Hydrants.

1. Water supply for installed fire suppression systems shall be required as a part of the project for new facilities. Water supply requirements are contained in AFM 88-10 and NFPA 13.
2. Fire hydrant spacing shall be in accordance with AFM 88-10. At least one hydrant shall be within 200 feet of the facility.

G. Utilities.

1. Electric wiring shall be installed in accordance with the National Electric Code, NFPA 70.
2. Equipment utilizing gas and related gas piping shall be installed in accordance with National Fuel Gas Code, NFPA 54.
3. Air conditioning, heating, and ventilating ductwork and related equipment shall be installed in accordance with the applicable standard on Air Conditioning and Ventilating Systems, either NFPA 90A or 90B.

## CHAPTER VI

### Energy Conservation

Facilities should be designed, constructed and operated to conserve energy resources to the fullest extent possible, while providing developmentally-appropriate environments for children. Use energy conserving techniques for both site development and building design. Consider solar orientation, building compactness, and passive conservation measures as well as active measures as appropriate for each individual project.

#### A. Building Envelope.

1. Design all walls to conform to Air Force criteria for "U" values.

2. Provide minimum sized windows. Current window/wall ratio criteria shall be used to determine amount of windows and appropriate sizes. (Use of windows shall depend on prevailing climate conditions.) (Fixed glass should extend as close to floor as possible.)

3. Use overhangs, vestibules, angles, and shading devices in the design where applicable to reduce energy usage.

#### B. Site.

1. Use landscaping, earth berms, etc., where appropriate.

2. Orient the facility to take advantage of or decrease the impact of the following characteristics:

a. Sun angles and average number of sunny days per season.

b. Wind directions and velocities per season.

c. Precipitation amounts per season.

d. Shadow lines from adjacent buildings.

e. Wind buffers (orient with a closed side facing winter winds and an open side facing cooling summer breezes).

3. In temperate and cold climates, use deciduous trees (rather than evergreens) within the outdoor play area and near the building; they will provide shade in summer and will not block the sun in winter. Use areas of partial shade as appropriate. They should only be dominant in hot and humid climates and should be used in conjunction with shade and natural ventilation.

4. Consider the use of trees, shrubs, and grass to provide significant cooling through evaporation.

5. Vine coverings on walls and trellises can serve as temperature control devices and can help control daylighting intensities.

6. Use earthforms, dense evergreens, and existing building as windbreaks on the side of the outdoor area facing prevailing winds.

7. In colder regions, use windbreaks to trap snow and prevent build-up on the roads and walks of the site. Windbreaks or shelter belts are most effective when placed perpendicular to prevailing winds.

C. Building Systems. The proper design and construction of building support systems, i.e., heating, cooling, ventilation, and electrical is one of the most significant ways of reducing energy consumption. The type system selected, therefore, should be based on sound economic and energy decisions.

1. Consider the use of active and passive solar systems. All facilities should have some aspects of passive solar incorporated into the design. Active solar systems should be considered for facilities with large domestic hot water consumption and air conditioning load in excess of 50 tons. It should be considered for heating when the payback period is 25 years or less.

2. Give consideration to features/systems that are known to be low energy users and have low cost operating features. Some features/systems to be considered are:

- a. Integrated heat of light - illumination systems.
- b. Water side heat pump.
- c. Multizone systems.
- d. Variable air volume systems.
- e. Night/weekend thermostat setback.
- f. Connection to base EMCS.

3. Electrical designs shall complement features that incorporate reduced energy usage. Consider a combination of general and task lighting.

## CHAPTER VII

### Site Development

#### A. Building Site Selection.

1. General. The site or sites for child care service facilities are shown on the Installation Master Plan. These sites should be reviewed relative to the following criteria, or, if sufficient sites are not shown, they should be chosen in accordance with these criteria. Major criteria include adequate size, location on the seams between housing areas, desirable proximities, and favorable features of the site as detailed below.

a. The site must be large enough to accommodate the building, outdoor playgrounds, vehicular areas and parking, setbacks and open spaces.

b. Locate the child care centers as near as practicable on the seams of two or more family housing areas. They also should be close to other community resources.

c. Provide a minimum of 700 SF per child, or 0.02 acres per child for the building, playgrounds, vehicles, setbacks and open spaces.

d. The following is a list of features which can aid staff and children in utilizing the outdoors and which should be considered in selecting a site:

(1) Locate child care centers near places of natural interest to children to encourage the use of natural environment as a learning environment and for field trips (e.g., near natural areas, fields, rock outcroppings and woods.)

(2) Locate child care centers near other children facilities, and consider the possibilities of sharing facilities or programs (e.g., preschools, youth activity centers, innovative play environments).

e. Avoid locating facility near the following hazards and nuisances:

- (1) Odors or smoke.
- (2) Heavy traffic.
- (3) Dust and pollution.
- (4) Security areas.
- (5) Railroads.

(6) Aircraft runways.

(7) Other safety hazards.

f. Site the facility so that the building:

(1) is clearly visible to cars and pedestrians coming to the facility (consider that children have smaller, lower angle of vision);

(2) is in relation to natural features so that views from the public domain will be framed, but not obstructed by trees and other elements;

(3) can afford viewers glimpses of outdoor play activities. However, do not create a fish-bowl out of either the outdoor yards or any indoor space;

(4) does not destroy any favorable features on the site for children, e.g., a stand of trees, a hill for climbing, rolling, winter tobogganning, or a good view of interesting nearby features;

(5) is able to capture sunny exposures in the spring and fall and so that indoor spaces will open directly onto sunny outdoor spaces, with adequate sun filtering in hot climates.

g. In colder climates, provide a sun/shade mixture in summer and full sun in winter.

B. Module Site Selection/Design. The following shall be considered for large installations that require one large centralized facility subdivided into semi-autonomous modules of 60-75 children each. Site modules:

1. or buildings so that each module has its own playgrounds for each age group served;

2. so that any equipment for which there is a sizable economy saving through sharing can be shared by all the modules (e.g., common delivery and service area, common kitchen).

C. Parking and Walks. Provide safe points of facility access for children and adults which are separate from automobile circulation. Design drives and walks which preserve and utilize the natural landscape.

1. Walks:

a. Provide a sheltered walkway leading directly from the drop-off point to the building.

b. Connect the building to the public sidewalk system, to parking, and to the covered drop-off porte cochere with pedestrian walks. Minimum width should be 4 feet.

c. Create interesting pathways which meander and curve, which go through natural areas wherever possible, and which overlook interesting sights including the playgrounds.

## 2. Parking:

a. Analyze the parking areas and access roads carefully during the design process to prevent them from becoming a major focal point of the facility. Share parking with others where practical.

b. The drop-off point for cars or buses should be close to the entrance.

c. Locate parking for parents, staff, and visitors near the building with a view to the entry. Separate and visually screen vehicular access, service areas and parking from the play areas.

d. Provide a service vehicle apron.

e. Provide bus access if applicable.

f. Allow between 150 and 200 SF/car for circulation in parking areas and drives plus an additional 660 SF minimum for the drop-off and porte cochere.

g. Two-way approach drives should be 20 feet wide, single lanes require 12 feet in width.

h. Allow minimum of 200 SF per car for parking only and 396 SF per car for parking and drives.

i. Provide one parent/visitor space per 12 children, handicapped spaces in accordance with ANSI criteria and one staff space per 1.25 staff.

j. Provide short term/drop-off parking spaces (5 minutes) duration, based on 1 space per 20 children.

## 3. Roadways:

a. Provide adequate lighting for all roads; lighting is required for the approach drive and parking areas.

b. Four basic functions require service access to a typical child care facility. Regular food deliveries to the

storage and kitchen area; occasional supply deliveries (furniture, laundry, books, toys, etc.); mechanical room-related deliveries (fuel, maintenance equipment); and garbage pickup. The following should be provided:

(1) Service access area should accommodate a large truck (delivery van size).

(2) A back-up spur should be provided for dead-end and service drives which exceed 100 feet in length.

(3) Access should be close to the serviced areas; i.e., kitchen, garbage storage (either indoor or outdoor), mechanical room, and service entry, if one is designated.

d. Screen the service area from public use areas with fences, depressions, plants, shrubs, trees and berms. Provide physical barriers to separate outdoor child care areas from all service areas.

e. Avoid service access through playgrounds.

D. Outdoor Activity Spaces. Provide outdoor playgrounds which are planned as a series of separated but linked activity areas with clear circulation and designed in accordance with design principles for indoor activity areas. Provide three distinct areas for the following age groups: 3 and under; 3 to 5; and 5 and older. All playground's fences shall be a minimum of 5 feet high. Avoid fencing materials that encourage climbing or produce splinters. Develop the play areas to permit some cross-age groupings on a limited scale.

1. General Design Guidelines:

a. Zone the playground in response to site conditions, age groups and activity.

b. Scale the site and the play equipment appropriately for each age group.

c. Provide proper drainage on the site to extend the season of use and to allow outdoor play soon after inclement weather.

d. Playgrounds should be close to restrooms and outdoor water fountains.

e. If an outdoor use space must be created on a northeast or northwest side of the site, keep the building on the north side of the site as low as possible to minimize the shade created by the building.

f. Consider surfacing materials that dry quickly (paving, asphalt) for porches and wheel toy circulation paths and pads. Limit the use of this type of material to the aforementioned areas only. A mixture of various surfacing materials such

as grass, sand, artificial turf and others shall be utilized as appropriate.

g. Design the indoor play areas and other spaces which rely on visual connection to the outdoors so that children do not have to look into the sun. Overhangs and other natural shading features will reduce the solar heat load.

h. The same party responsible for the facility design shall design the playground equipment and support/foundations. All equipment foundations shall conform to current safety standards.

i. Site the outdoor play areas to permit adequate supervision.

2. Porches and Decks. Consider the use of porches and decks as part of outdoor activity spaces. If these are included in the design, apply the following criteria:

a. Provide approximately 1 SF per child for porches and decks as activity spaces with a minimum area of 50 SF. In calculating building gross square footage, calculate these areas at 50%.

b. Locate porches on the most sheltered side of the building in hot climates, and on the sunny side, away from prevailing winds in colder climates.

c. Relate the porch directly to the appropriate indoor activity areas and to the architecture of the building.

d. Provide close proximity to a clean-up area and toilet rooms.

e. Provide a minimum width of 7 feet for a porch or deck space.

f. The play areas will be most usable when the more sheltered areas are next to the building and the more open areas are blended with the outdoor playgrounds.

g. Ensure the porch drains easily and has a quick-drying surface.

### 3. Children Outdoor Activity Areas:

a. For the 3 years and under group, provide clearly defined infant and toddlers areas conforming to the following guidelines:

(1) These two areas are separate but not isolated from each other and other age groups. Connect the infant area to indoor infant spaces.



(2) Create soft, multi-textured, crawling surfaces with warm materials, and play spaces which are infant-scaled but safe for use by infants and young toddlers. Include small steps, slopes, climbing ramps, slight barriers, and slides in this area.

(3) Provide an outdoor area for toddlers responsive to the needs of their physical, social, and cognitive development. Allow for individual and small-group activities.

(4) Size the activity area based on 50 SF per infant and 100 SF per toddler, but provide no less than 2100 SF for the total area.

(5) Provide direct access to infant indoor activity spaces. Do not use steps.

(6) In infant areas, provide a variety of surface materials such as wood and asphalt for push or ride toys and grass and sand for crawling.

(7) For toddler areas, provide a variety of areas and surfaces such as protected sand and dirt play, informal playing areas, open grassy playing areas, and designated play structures. Provide areas to support social play and peer interactions, e.g., nests for quiet play and small arts and crafts nooks. Provide areas that support cognitive development, such as children's gardens.

b. For the 3 to 5 year old group, provide outdoor activity spaces.

(1) Provide a variety of activity areas. Areas should be sized to handle both individual and group activities.

(2) Size the activity area based on 100 SF per preschooler.

(3) Provide spaces for activities in open grassy play areas, informal paved areas, and designated play structures.

(4) Provide a minimum of 200 cubic feet of outdoor storage. This storage should be child-accessible, vandal-proof, and weathertight. Locate the storage units throughout the play space to hold items needed for special activities, e.g., in the arts and crafts area, blocks in a creative play area, etc.

c. For the five year old and older children, provide a special outdoor activity area. This area should allow for exploration, challenge, and modification, and support individual or group activities which promote cooperation.

(1) Size the activity area based on 100 SF per child.

(2) Locate this area close to community-shared public park space and playing fields near the facility for overlap use.

(3) Provide a variety of activity spaces that offer challenge without extreme competitiveness, e.g., single basketball hoops rather than entire courts, small baseball and soccer areas, and climbing elements like good climbing trees or built structures.

(4) Provide areas for environmental yards, adventure play areas, supervised fire and cooking areas, picnic areas, covered play pavilions, fenced animal areas, and children's gardens.

(5) Provide outdoor storage as appropriate for special areas, e.g., tool shed for environmental yard and children's gardens, supply shed for adventure play areas, etc. All of this storage should be accessible to school-aged children, and be lockable, weathertight and vandal-proof.

## CHAPTER VIII

### Interior Design/Color

#### A. Interior Design Requirements.

1. Use comprehensive interior design services for child care centers. These services may be provided by one of the MWR and transient billeting interior design staffs at HQ AFMPC or several MAJCOMs.

2. The interior design staff will work with the building designer in selecting and coordinating structurally related items, i.e., wall finishes, carpet, etc. Additionally, the interior design staff will recommend furnishings. The furnishings recommended will be from appropriate GSA or NAF sources dependent upon type of funds.

#### B. Interior Design Techniques.

1. Perception of color dominates from early childhood, and color is a strong visual cue. To be effective, color cues must be at least partially appropriate to children's levels of perception. Large expanses of very vivid colors are not appropriate. Rather, use smaller areas of bright color to highlight areas.

2. Emphasize expected activity levels or highlight a high-use object by using bright, vivid colors appropriate to the activity: red-orange-yellow hues for very active areas; blue-green-purple shades for more quiet areas.

3. Choose neutral colors for large background areas and walls used for display.

4. Textures help cue children in activity areas. Soft textures help children to feel relaxed and quiet, while harder finishes and surfaces make a space noisier and livelier. Floor textures can be used to emphasize activity space boundaries since children spend so much time on the floor.

5. Where appropriate, use color-texture graphics on the floor and on the walls below 3 feet.

6. Leave some walls or the structural members semifinished to encourage staff and children to paint them themselves, and to be able to attach partitions or props against them.

7. The use of lead-based paint is prohibited in child care facilities. In renovated facilities, test existing paint for lead content (either by direct read-out instrumentation or by chemical analysis of samples). If lead paint is found, remove it.

C. Furnishings.

1. Select the furnishings in a child care facility for their flexibility, variety, safety, sturdiness and anthropometric suitability. Use the furnishings to define activity spaces and circulation paths.

a. Use furnishings and movable partitions which have many uses and can be easily moved by staff to help define activity areas (e.g., storage units, display space, puppet stages, etc.).

b. Size the furnishings to be comfortable for the designated age group.

c. Select furnishings that do not have sharp corners or edges, will not splinter, do not have toxic surfaces, or cannot be easily tipped over.

d. Make floor level changes by means of movable platforms rather than by actual level changes in the floor construction.

2. Establish furniture and equipment needs for each space. Estimate costs for free-standing furniture and equipment based on the GSA Federal Supply Schedules, Federal Prison Industries Schedule, and the general GSA Supply Catalogue. These sources are mandatory insofar as they meet requirements, and cost estimates should be based on prices therein, escalated to time of actual procurement. Certain products used by child care centers are not available through normal mandatory services. These should be obtained on the open market.

3. The following are typical furniture items:

- a. desks, chairs, tables;
- b. storage units, including movable storage units;
- c. low, movable dividers;
- d. audio-visual equipment;
- e. bookshelves, racks, and open storage;
- f. cots, mats and cribs;
- g. infant changing tables;
- h. sand and water tables, easels, etc.;
- i. kitchen equipment;
- j. nature and science equipment;

- k. rugs, cushions, bean bags, stuffed chairs; and
  - l. outdoor play equipment.
4. Carpets shall comply with fire resistance requirements.

## APPENDIX A

### Major Program Determinants and Options

#### Proposed Decision Schedule

<u>Subject</u>	<u>Determinants</u>	<u>Options</u>
A. Scope of Project	<ul style="list-style-type: none"> <li>• Base population receiving direct installation support (AFM 86-2)</li> <li>• Waiting list</li> <li>• Special situations</li> <li>• Use of other facilities for child care</li> </ul>	<ul style="list-style-type: none"> <li>• Stay within AF criteria</li> </ul>
B. Location	<ul style="list-style-type: none"> <li>• Can housing area support a whole center considering its child population?</li> <li>• Portion of patrons coming from off-base</li> <li>• Major destination of patrons after leaving children</li> <li>• Land availability</li> <li>• Total base size</li> <li>• Staff limits</li> </ul>	<ul style="list-style-type: none"> <li>• Satellite centers in/near housing and main center in central location</li> <li>• Main center in one location (See C)</li> </ul>
C. Large Central Location	<ul style="list-style-type: none"> <li>• Climate</li> <li>• Program operation</li> </ul>	<ul style="list-style-type: none"> <li>• Separated buildings in campus plan with common facilities in one of the buildings</li> <li>• Large building with modules connected with circulation spine</li> </ul>

NOTE: There are several other decisions that must be made concerning other subjects that will affect the designer's approach such as the treatment of hourly care children, adult-child ratio, playground design approach, 24 hour care, food service, procedure, etc.

a. Gas (LPG, natural, special)

b. Steam

c. Other (fill in)

2. Heating plant and/or ventilation and air conditioning information.

a. Location

b. Type

c. Current and expected loads

d. Controls and EMCS capability

3. Power:

a. Power service characteristics

b. Stand-by power capability

c. Sub-station adequacy

d. Outage duration limitation

e. EMCS connections and controls

4. Water supply:

a. Identify source

b. Identify treatments

D. Miscellaneous.

1. Identify fill sites and landfill areas.

2. Identify operating hours.

3. Indicate labor and water availability.

4. Provide pertinent DD Form 1391 statements.

## APPENDIX B

### Checklist For Local Site Conditions

The following is a list of items that should be considered in preparing the statement or scope of work that will be furnished to designer of the facility.

All areas that are pertinent to the individual project shall be addressed. These items should also be considered where appropriate in following the proposed decision schedule in Appendix A. This list is not to be considered all inclusive, but as a guide to those areas which significantly impact the design, therefore base personnel are encouraged to expand upon it where necessary.

#### A. Site Plan.

1. Indicate existing access to site of proposed facility.
2. Indicate existing grades and contours (try to avoid locating centers in areas with abrupt grade and/or contour changes).
3. Identify existing utilities and structures in vicinity of new facility.
4. Avoid locating facility near those types of structures as listed in Chapter VII.
5. Avoid locating in flood hazards plain.
6. Identify utilities the new facility will require noting those that are not available in area.
7. Identify parking and paving needs.
8. Identify utility distribution network.
9. Identify prominent site features such as trees, swales, etc.

#### B. Facility.

1. Identify seismic zone, typhoon-hurricane-wind/snow load design criteria (note high loss vs low loss potential).
2. Identify architectural style predominate on the base. If facility is to be an addition, indicate style of present building.

#### C. Facility Support Systems.

1. Energy Source (note which type).



# APPENDIX C

## Recommended Space Allocations for Typical Child Care Centers

The following are suggested minimum square footage allocations for specific areas within the facility. In certain cases maximum needs will be given. This will be clearly noted. For purposes of this chart, certain assumptions were made as to breakdown of ages of the children using this facility in order to establish square footages for the individual activity rooms. This chart is to be considered a guide only for what might be considered a typical. Each Air Force base must consider its particular individual needs and requirements in establishing the size of the center, the number and age group of children to be served. The footnotes at chart headings will give the assumed groupings by age and number of children to be served.

Center Size Room Name	Small Centers up to 75 children	Medium Centers up to 150 children	Large Centers up to 225 children	Outsize Centers up to 300 children
A. Interior Spaces	1	2	3	4
1. Entry/Vestible	48	65	95	130
2. Lobby	120	230	340	455
3. Reception	105	155	225	295
4. Isolation	50	50	105 <sup>5</sup>	105 <sup>5</sup>
5. Isolation Toilet	35	35	35 <sup>6</sup>	35 <sup>6</sup>
6. Director's Office	70	100	120	220
7. Staff Room	170	240	335	445
8. Staff Room Toilet <sup>7</sup>	24	55	55	80
9. Staff Closet	15	20	20	20
10. Central Storage	40	80	120	160
11. Early Infants	485 <sup>8</sup>	Provide two modules, each one totalling the sizes indicated in the first column.		Provide four modules, each one totalling the sizes indicated in the first column.
a. Food warming	[ 55]			
b. Diapering/storage	[ 20]			
c. Crawl	[175]			
d. Cribs	[175]			
e. Nursing	[ 60]			
12. Infant Staff Toilet	24			
13. Older Infants	425 <sup>9</sup>			
a. Food warming	[ 55]			
b. Diapering/storage	[ 20]			
c. Crawl	[175]			
d. Cribs	[175]			
14. Infant Staff Toilet	24			
15. Toddlers	700 <sup>10</sup>			
Diapering	20			
16. Toddler Storage <sup>11</sup>	55			
17. Toddler Learning Toilet <sup>12</sup>	35			
18. Preschoolers	700 <sup>13</sup>			
19. Preschool Learning Toilet <sup>12</sup>	35			
20. Preschool Storage <sup>11</sup>	60			
21. Dining/Multipurpose <sup>14</sup>	765	1530	2295	3060
a. School age area	[525]	[1050]	[1575]	[2100]
b. Unassigned area	[130]	[ 260]	[ 390]	[ 520]
c. School age toilet	[ 50]	[ 100]	[ 150]	[ 200]
d. School age storage	[ 60]	[ 120]	[ 180]	[ 240]
22. Parent-Staff Corner	- 15	100	100	100
23. Kitchen	360	490	560	630
24. Kitchen Storage	45	60	80	95
25. Laundry (Maximum Size)	80	80	80	80
26. Janitor Closet <sup>16</sup>	20	40	60	80
27. Drop-Off Zone <sup>17</sup>	700	700	1000	1000
Total SF/Bldg. (Typical)	4860	8806	12814	16742
Circulation	670	1760	2560	3350
Other	95	584	1501	2408
Mechanical Equipment <sup>18</sup>	140	260	385	500
Total Max. Allotted SF/Bldg.	5625	11250	16875	22500

<sup>1</sup>This size is geared for 20 infants (10 early, 10 older), 20 toddlers, 20 preschoolers and 15 school aged children.

<sup>2</sup>This size is geared for 40 infants (20 early, 20 older), 40 toddlers, 40 preschoolers and 30 school aged children.

<sup>3</sup>This size is geared for 60 infants (30 early, 30 older), 60 toddlers, 60 preschoolers and 45 school aged children.

<sup>4</sup>This size is geared for 80 infants (40 early, 40 older), 80 toddlers, 80 preschoolers and 60 school aged children.

<sup>5</sup>Provide two separate rooms.

<sup>6</sup>Isolation toilet shall be shared wherever possible. If not possible, then provide two separate isolation toilets.

<sup>7</sup>Combine this space with school age toilets.

<sup>8</sup>Based on 10 infants.

<sup>9</sup>Based on 10 infants.

<sup>10</sup>Based on 20 toddlers.

<sup>11</sup>See Appendix E.

<sup>12</sup>Combine toddler and preschool into one toilet room per 75 child module.

<sup>13</sup>Based on 20 preschoolers.

<sup>14</sup>For larger centers, one dining room is preferred, however, if necessary, two rooms may be provided.

<sup>15</sup>In this size center, combine space with staff lounge.

<sup>16</sup>Provide one closet per two modules.

<sup>17</sup>Area for this space counts as 50% of actual room square footage.

<sup>18</sup>This space does not count towards the building gross square footage.

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Center Size	Small Centers	Medium Centers	Large Centers	Outsize Centers
Room Name	up to 75 children	up to 150 children	up to 225 children	up to 300 children

# B. Exterior Spaces

## 1. Playground<sup>19</sup>

a. Infant	1000	2000	3000	4000
b. Toddler	2000	4000	6000	8000
c. Preschool	2000	4000	6000	8000
d. School-age	1500	3000	4500	6000
Totals	6500	13000	19500	26000

## 2. Playground Storage<sup>20</sup>

## 3. Parking Spaces

a. Visitors/parents	7	13	19	25
b. Staff	8	14	21	27
c. Short term	10	15	23	30
Total Spaces	25	42	63	82

<sup>19</sup>This represents total minimum space to be provided. The number of individual areas is left to the designer's discretion.

<sup>20</sup>See Appendix E.

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## APPENDIX D

### Additional Activity Area Requirements

This section is devoted to the activity centers or pockets within the activity rooms of child care centers that will be provided to stimulate and encourage the emotional and physical growth of the children. Activity centers or pockets are to be provided for each age group as appropriate. Allow for storage, surface area, equipment, and display within each center. Texture, color, and task lighting shall be used to define spaces. The centers may be used to define and articulate the modified span plan.

Activity Areas Spaces. Within every major activity room, consideration should be given to including the following activity centers:

1. Quiet places. Provide a place for children to rest or separate themselves from the group. These shall range from 6 to 25 SF for 1 or 2 children, smaller for infants and toddlers, larger for preschoolers.

- a. Locate these spaces in quiet areas away from major circulation routes. Keep them child-scaled and outside the domain of adults. Adults should be able to reach hiding places to intervene if necessary.

- b. These spaces can be located in high places with steps leading up to nooks at safe heights surrounded with protective edges and places for the child to peer out.

- c. These spaces should have the following characteristics:

- (1) low, dry place off the ground for sitting;
    - (2) single access that restricts circulation and may be controlled by children (e.g., flaps, gates);
    - (3) direction that captures the light but can also be darkened;
    - (4) variety of textures, colors, and shapes.

2. Elevated and sunken areas. Provide opportunities for children to engage in activities at a variety of levels or heights above the ground. These spaces shall include graduated safe challenges for children of different ages and motor abilities, but are safe.

- a. Design high spaces so they are safe for children, e.g., gradual stairways imbedded in the rest of the building, no large gaps in railings, no places where children can fall to the ground, etc.

b. Design low spaces (e.g., those under 4 feet under higher platforms) so that staff can see in and can have immediate access but children still have a sense of privacy.

3. Provide protected, private places where children can retreat or break-away from activities and observe other children. Include alternative exits from any activities which may be too challenging for some children. All retreat and observation points should be child-scaled, partially protected from other activities, and yet have easy viewing access to other activities. Consider small window seats, platforms, cubby-holes, nests, spaces under ladders, or stairs, etc.

4. Provide spaces for children to express and release emotional anxieties, such as anger, tension, or frustration with themselves, others, or the environment, or just to withdraw and cool off.

a. Provide secluded areas sheltered from sensory overload.

b. Provide soft areas where children can kick and punch away any violent aggressions.

c. Provide a place for building where children can become involved in building, tearing down and rebuilding.

d. All time-out and emotional release areas shall double function so that they would not become stigmatized with behavioral problems, i.e., "The room for bad children ...."

e. Provide active and passive color schemes: earthy reds and ochres are conducive to high activity; yellows are bright and cheery; light blues and grays are quieting and soothing.

5. A reading and listening area should be provided in each room for children two and over. It should be an intimate, quiet and comfortable space, offering a variety of sitting and reclining positions for individual and small group reading. Furnishing should accommodate storage and display of books and materials accessible to children. Lighting should reflect a home atmosphere with well shielded incandescent lamps.

a. Provide general ambient lighting at 30 fc., and task lighting on resources and special reading areas at 50 fc. Light level controls are desirable.

b. Sound insulation is necessary. Carpet the area. Ambient noise should be a maximum of 30 dbA. Reverberation time should be a maximum of 0.6 seconds. Reduce internal noise to a Preferred Noise Criteria (PNC) of 35 dbA.

c. Provide storage and display space for reading materials at child height. The reading area requires sufficient display space for showing the front covers of 20 to 25 books.

6. Provide a dramatic play or imaginative area of 48 SF minimum non-objective setting for toddlers (minimum 3 SF/child) and 60 SF minimum setting for preschoolers.

a. Locate these pockets in a relatively quiet zone away from major circulation and concentrations of adults, but near the music area.

b. Consider a two-level dramatic play area, one level shall be objective, and the other level non-objective.

c. Provide a variety of ambiguously shaped spaces, e.g., spaces which can be interpreted by the child or by a group of children in a variety of evocative ways. Don't emphasize, therefore, spaces which can only be interpreted in one way, e.g., a "castle," a "boat," a "crow's nest," etc.

d. Consider building play frames with sliding panels.

e. Provide natural daylight. A view out is optional.

f. Provide 30 cubic feet of storage for props and play items at child height.

7. Provide a music center with seating for four to five children, storage for musical instruments, and carpeting.

a. Provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler) and a minimum of 60 SF for preschoolers (minimum 3 SF/preschooler).

b. Provide a minimum 65 SF for school age children (minimum 4 SF/child).

c. Locate the music center away from major circulation paths, but close to compatible areas such as flexible motor activities area which might be expanded to accommodate combined music-dance activities.

d. Provide task lighting where appropriate, e.g., over piano, highlighting instrument storage, etc., and general lighting at standard levels.

e. A view out is optional.

f. Provide three child-proof 115-120V electrical outlets.

g. Additional acoustical insulation or separation should be provided if a piano is utilized.

h. Allow about 40 cubic feet of storage.

i. Provide child accessible storage for instruments, music and electronic equipment (phonographs, headsets). It should be child-accessible. An equal amount of teacher-only storage should be provided for musical instruments and materials not to be used at will by children, segregated by height and in a variety of shapes and sizes to accommodate items.

8. Provide an acoustically buffered area for five to twenty children which is easy to darken for using audio-visual aids. Double-function this area with the music nook where appropriate.

a. In large module-plan centers, provide a minimum 200 SF space for all age groups to share.

b. Locate near a central resources storage area.

c. Provide an antenna or cable hook-up for TV and video tape player.

d. Provide task lighting. Lighting levels in this area should have controls to provide a range of darkness.

e. Provide a screen or a white wall.

9. Provide a separate arts and crafts center for the following groups in the quantities indicated:

a. Provide a minimum 48 SF for toddlers (minimum 3 SF/toddler).

b. Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschoolers).

c. Provide a minimum 100 SF for school age children (minimum 7 SF/school age child).

d. Provide natural light and a view out.

e. Provide a two child-safety 115-120V electrical outlets.

f. Provide sink with hot and cold water and counter space.

g. Provide floor and wall surfaces impervious to clay, paint, etc.

h. Provide storage for supplies, unfinished work (both 2- and 3-dimensional), and drying racks.

i. Provide display space: tackboard and shelves.

j. Provide space for double easels and both horizontal and vertical work surfaces for drawing and construction.

10. Provide a games and manipulative toy play area to meet the following criteria.

a. For infants, provide a minimum 30 SF area for toys (minimum 3 SF/infant). It can be an area where toys can be hung or taken from low shelves, a surface adequate for push-pull toys, and ample storage.

b. For toddlers, provide a minimum 36 SF area (minimum 2.25 SF/toddler). Provide a variety of floor surfaces as well as table tops for playing games, puzzles and small manipulables.

c. For preschoolers, provide a minimum 60 SF area (minimum 3 SF/child), to accommodate a variety of games and activities such as puzzles, peg boards, felt boards, manipulative activities, etc. Include plenty of table and floor space for both individuals and small groups.

d. Provide a semi-enclosed space that is protected from loud boisterous activities, yet allows for adult supervision.

11. Provide block play accommodated in small areas where one to four children can play with small blocks, and in an adjacent, larger, multipurpose open space. Acoustic separation, plenty of storage and the possibilities of sub-spaces are required.

a. For infants, provide an area of 20 SF (2 SF/infant) where lightweight blocks can be manipulated (light wood, plastic, or styrofoam).

b. Provide a minimum 48 SF area for toddlers (minimum 2 SF/toddler).

c. The block play area may double-function with the place for woodworking if only preschoolers are being planned for. Provide a minimum 60 SF block play area and adjacent to it, one 100 SF place for woodworking.

d. Separate block play from circulation and other activities by level change, low height barriers, raised platforms as work areas, changing floor surface materials and other architectural indicators.

e. Design for peak noise levels up to 80 dbA, but reduce generated and ambient noise to 40 dbA. Use sound absorbers wherever possible to help reduce noise levels, e.g., a firm carpet, soft wall hangings, cork display boards, etc.

f. Provide general ambient lighting at 50 fc with multi-level switching to allow flexibility.

g. Provide a minimum of 20 cubic feet of easy-to-reach dispersed block storage. Use materials carts or storage units on wheels as dividers.

12. Provide a science discovery area containing animals, plants, and physical science materials organized in a manner conducive to contemplative and participatory learning experiences in a naturally lighted, quiet, protected setting. When this program is included in the facility, the following criteria applies:

a. Size:

(1) Provide a minimum 40 SF for infants (minimum 4 SF/infant).

(2) Provide a minimum 48 SF for toddlers (minimum 3 SF/toddler).

(3) Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschooler).

(4) Provide a minimum 65 SF area for school aged child (minimum 4 SF/child)

b. Locate the nature discovery area on the east or southeast side in good natural light. It may even be a partial greenhouse or plant sunroom.

c. Separate this area from more active spaces and circulation paths.

d. The science discovery area must be visible and accessible to older infants and toddlers in areas only where adult supervision is adequate.

e. The science discovery area may be located in porches and decks where climate permits.

f. The assortment of plants and animals should have all around viewing. In addition to stand-up displays, seating areas and comfortable pillows should be around the plants and animals to encourage children to enjoy them with minimal disturbance.

g. Natural light is essential. Control light levels with screens or shades.

h. Provide task lighting at standard level (fc).



- i. Provide a view out.
- j. Provide two child-safe 115-120V electrical outlets.
- k. Provide a child-accessible washbasin with hot and cold water.
- l. Provide a child-accessible counter and work space with storage underneath. Counters shall be 20 inches high.
13. Provide a protected, naturally-lighted water play area with a variety of immersible props and a generous water surface. Provide water-proof wall and floor materials and proper drainage. When this program is included in the facility, the following criteria applies:
  - a. Provide a minimum 20 SF for infants (minimum 2 SF/infants).
  - b. Provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler).
  - c. Provide a minimum 60 SF for preschoolers (minimum SF/preschooler).
  - d. This activity pocket may double-function with sand play area for toddlers and preschoolers.
    - (1) Locate water play area conveniently to wash rooms, towels, storage for water play objects and outdoor play areas.
    - (2) Locate away from circulation and quiet areas.
    - (3) Locate water play area adjacent to sand play area if they are not double-functioned, and with close proximity to nature area.
    - (4) Provide task lighting at 50 fc with multi-level switching to allow flexibility. This area should also have natural light and preferably a view out.
    - (5) Provide sink with cold and hot water and a floor drain.
    - (6) Provide non-slip surfaces impervious to water and dampness (e.g., a wooden grid set on floor with drain below).
    - (7) Water play props might include a spray flow from one height to another, pools eight inches or so deep for floating objects, and possibly a movable light source (battery operated) and wind source.

(8) Locate the surface of water at child height.

14. Provide one or more sand play areas near water play areas. They should be on an abrasion resistant, cleanable floor surface. When this program is included in the facility, the criteria shall be as follows:

a. In medium-sized centers, the sand play area can double-function with the water play area.

b. In large centers, provide a minimum 36 SF for toddlers (minimum 2.25 SF/toddler).

c. Provide a minimum 60 SF for preschoolers (minimum 3 SF/preschooler).

d. A window with direct sunlight is required to dry and purify the sand.

e. Sand play area should be adjacent or close to a water source for play use and clean-up.

f. Provide task lighting at the standard level (fc).

g. When water is present, a floor drain is required.

h. Provide a floor surface that is easy to clean, not susceptible to damage from sand, and as seamless as possible.

15. Provide a place for woodworking and other tool activities within the block play area. When a woodworking space is included in the facility, the following criteria applies:

a. For preschool, double-function the place for woodworking with block play area in medium size facilities. In large module plan centers, provide a minimum 60 SF area for 20 preschoolers (3 SF/child. For school-age children, provide a minimum 100 SF area (7 SF/child).

b. This area should be separated from quiet zones.

c. Separate this space from circulation. A semi-enclosed space may even be desirable.

d. Natural light should be provided.

e. Generated peak noise level can be 80 db. Reduce ambient and internal noise to 40 db.

f. Provide storage for extra materials, display for materials in use, and storage for tools at child's reach.

g. Provide adults storage for extra wood and other materials inaccessible to children.

h. Provide hanging storage for tools. A pegboard with outlines of tools and color coding should be considered.

i. Provide a very sturdy work bench with vise and easy-to-clean, non-damageable surface, at child's height.

# APPENDIX B

## Storage Requirements

Room Name	Type Storage		Resource	Cubbies	Closed/ Secured	Closets	Mat or Cot	Outdoor Equipment <sup>5</sup>	
	Open							Closed	Open
Reception						One			
Manager/Director's Office						One			
Staff Room					16 to 24 CF	One			
Central Storage <sup>1</sup>			40 SF/75 children				-		
Infants				1 to 2 LF per infant infant. <sup>2</sup>	20 CF in activity centers <sup>4</sup>			25 CF/10 infants	25 CF/10 infants
Toddlers	2 LF shelving at 15" for 2 to 3 yr. olds and 18" to 22" for 3 to 4 yr. olds in activity centers.			4' x 7" (8" OC) Provide 1 per toddler. <sup>3</sup>	20 CF in activity centers <sup>4</sup>		Yes	40 CF/16 toddlers	20 CF/16 toddlers
Preschool	2 LF open shelving @ 20" to 24" in activity centers.			4' x 11" (12" OC) w/boot storage and sitting ledge. Provide 1 per child. <sup>3</sup>	20 CF in activity centers <sup>4</sup>		Yes	Suitable for toys and staff needs. May double function as part of play equipment. PA minimum 200 CF	
School-age	2 LF open shelving @ 24" in activity centers.			Same as pre-school. <sup>3</sup>	20 CF in activity centers <sup>4</sup>		Yes		
Laundry Room	For clean and dirty laundry.				Cleaning supplies				

1. Combine storage for AV media w/book shelving and equipment storage in this area.
2. Design these in a double row of cubicles across.
3. Provide hangers for coats that children can use and that do not present a hazard.
4. This storage area shall be accessible to caregivers only and shall be used for toys, supplies, etc.
5. Provide a bin for temporary storage of infant paraphernalia, such as bottles, tissues, blankets, etc. This area should be vandal-proof and watertight.

PA - Programmed Amount

### AFFINITY MATRIX

- 6 - Must be shared where feasible
- 5 - May share same space in small centers
- 4 - Must be next to each other with direct access
- 3 - Should be in close proximity
- (Blank) - Proximity not critical
- 1 - Should be separated by distance
- 0 - Walls or fence separate

## APPENDIX H

### Prototype Plans

The following plans show individual rooms or layouts of rooms that are included in a typical child care center. They are based on population, certain caregiver to child ratios and/or center sizes as listed in Appendix C and are intended only as a guide to design of spaces. Proximity of rooms is indicated in Appendix F. The following is a list of plates:

Plate 1 - Early/Older infants

Plate 2 - Toddler/Preschool Age Layout

The above 2 plates are based on populations and ratios listed on drawings and on page 2-3 of the guide.

Plate 3 - Entry sequence (Vestibule/lobby/reception/isolation/staff/parent staff corner/storage/director combination for large centers

Plate 4 - Entry sequence (small center) and dining/multi-purpose (small center)

Plate 5 - Kitchen layout for small center

Plate 6 - Kitchen layout for out-size centers, kitchen layouts for medium and large centers should be increased/decreased in accordance with Appendices C and G.

Plate 7 - Anthropometric chart for a child scaled environment.

Plate 8 - This list is a compendium of activities, areas, and their attributes as well as equipment applicability to each age group. Newly designed playgrounds should not include areas or equipment beyond those on this list without approval from HQ AFMPC/MPCSOB.

Plate 9 - Site plan showing drop-off zone and playground.

Plate 10 - Site plan showing drop-off zone and playground equipment.

# APPENDIX G

## Kitchen Major Equipment List

Equipment Type	Range <sup>1,2,5</sup>	Refrigerator <sup>3,6</sup>	Freezer <sup>6,10</sup>	Worktables/ Countertops <sup>7</sup>	Sink <sup>8,12</sup>	Dishwasher <sup>9,10,12</sup>	Electric Food Mixers <sup>11</sup>
Up to 75 children	One 42-inch commercial heavy duty gas or electric	One commercial 2-section, 2-door, reach-in type (Approx. 55 CF) <sup>3</sup>	One domestic up-right or chest of 20 CF.	16 L.F.	One 3-compartment, and 1 hand sink.	One commercial dishwasher, single tank door type. Provide soiled and cleaned dish table <sup>11</sup>	One 12-quart table model
76 to 150 children	Two 36-inch commercial heavy duty gas or electric	Two commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 90 CF) <sup>3</sup>	One domestic up-right or chest of 40 CF.	30 L.F.	DO	DO	One 20-quart floor or table model 1/3 H.P. motor.
151 to 225 children	Three 36-inch commercial heavy duty gas or electric	Three commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 135 CF) <sup>3</sup>	Two domestic up-right or chest. (One @ 30 CF) (One @ 40 CF)	45 L.F.	DO	DO	One 30-quart floor model H.P. motor
226 to 300	Three 48-inch commercial heavy duty gas or electric	Four commercial 2-section, 2-door, reach-in type (Approx. 45 CF each for a total of 180 CF) <sup>3</sup>	Two domestic up-right or chest. @ 40 CF each.	60 L.F.	DO	DO	One 60-quart floor model 1 H.P. motor

1 Range tops may be either open burners, hot tops or fry top (griddle) or any combination of same.

2 Ranges and other cooking equipment shall be equipped with an exhaust system. This system shall meet the requirements for hood (canopy), exhaust, grease removal device and fire extinguishing equipment as specified by local codes or in the National Fire Protection Association (NFPA) Publication 96, Vapor Removal From Commercial Cooking Equipment and have UL scale of approval.

3 Each shelf within refrigerator section should accommodate interchangeably one 18-inch by 26-inch sheet pan or two 12-inch by 20-inch hot food service pans. Both sections should have standard adjustable wire shelving, or the upper half of one section should have pan files that can accommodate interchangeably 18-inch by 26-inch sheet pans and 12-inch by 20 inch hot food service pans.

4 Refrigerator shall be NSF and UL approved, 115 volts, single phase.

5 Oven may be convection-type with electrical blower fan for circulating air within oven compartment.

6 Provide exterior mounted built-in indicating thermometer; power indicator, high temperature, warming and interior lights.

7 This number is the total that can be provided. It may be in any combination of work tables and/or countertops as long as the total quantity is not exceeded. The tables should measure as a general rule from 4 to 8 feet long, 30 inches wide (24 to 48 acceptable) and 34 inches high. should be constructed of 14-gauge 18-8 stainless steel with adjustable tubular legs and a full length undershelf for storage of sheet pans, hot food service pans. If built-in countertops over floor cabinets, under counter refrigerators, dishwashers, etc. are used as worktables, then the countertop should be in excess of 18" deep (from front to back) and 24" wide (from side to side). Countertop should be stainless steel.

8 Sinks shall be 14-gauge 18-8 stainless steel with integral drainboards. Each compartment should measure at least 30" x 24" x 14" deep with exterior-operated lever waste control. Separate drain system shall be provided for each compartment.

9 Commercial counter or undercounter, stationary rack with 2; to 3 minute wash/rinse cycle that uses either chemical sanitizing final rinse or water in excess of 180°F for final rinse. In the latter case, a hot water booster heater will be required to provide 180 degrees and indicating thermometers should be installed for measuring wash water and final rinse water temperature. A chemical sanitizing final rinse will preclude necessity of a hot water booster.

10 Must have NSF and UL approval.

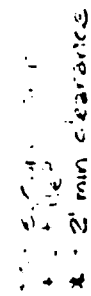
11 These tables shall be approximately 60 inches long and 27 inches wide each, of 14 gauge 18-8 stainless steel with backsplash and adjustable legs. Must have NSF approval.

12 Additional units may be provided at the option of the user.

NSF - National Sanitation Foundation

UL - Underwriter's Laboratories

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permit fully legible reproduction

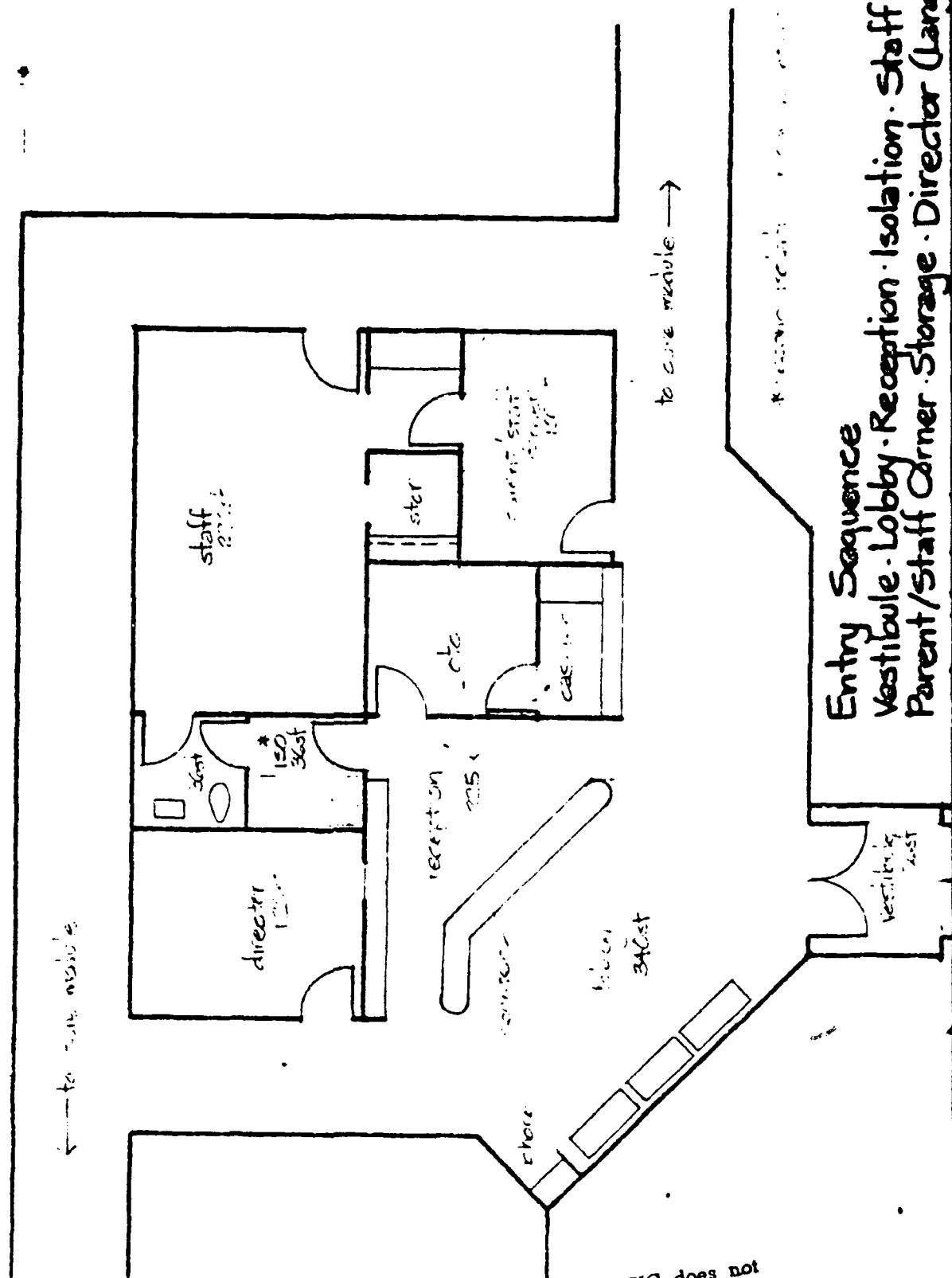


Group	Ages	Max Group Size	Staff Req'd	Room Size (sq. ft.)
Early Infant	6mo-6mo	8	2	225-400 sf
Older Infant	6mo-18mo	16	2	225-400 sf

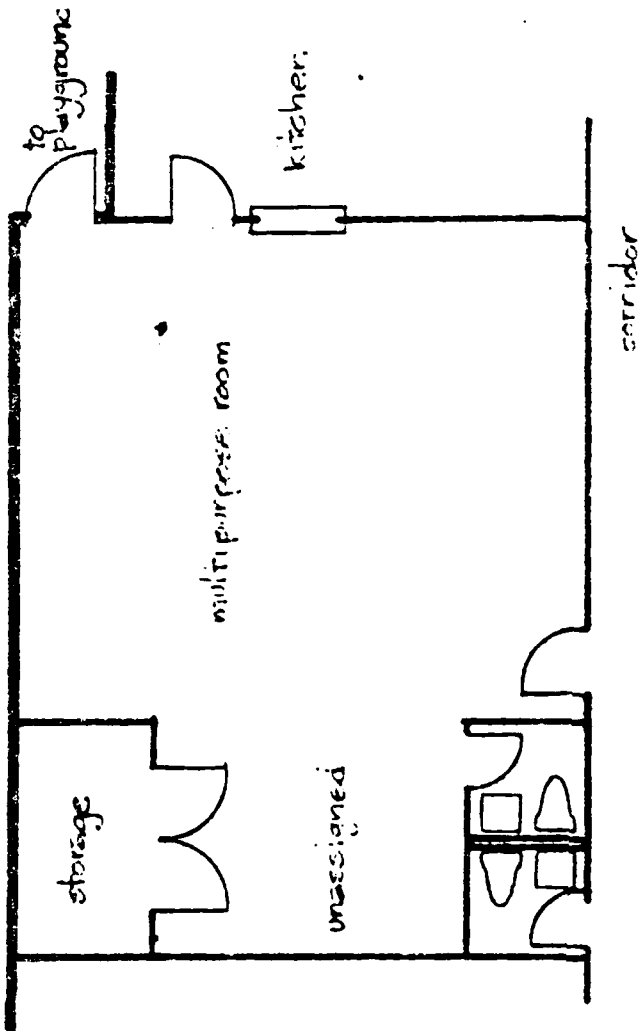
Early/Older Infants







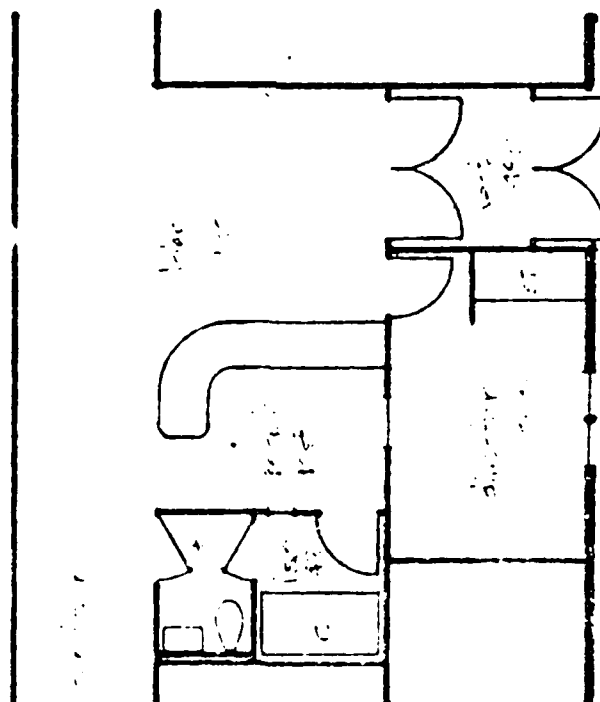
Entry Sequence  
 Vestibule · Lobby · Reception · Isolation · Staff.  
 Parent/Staff Corner · Storage · Director (Large Ctr)



# Dining/Multipurpose

Scale 1/8" = 1'-0"

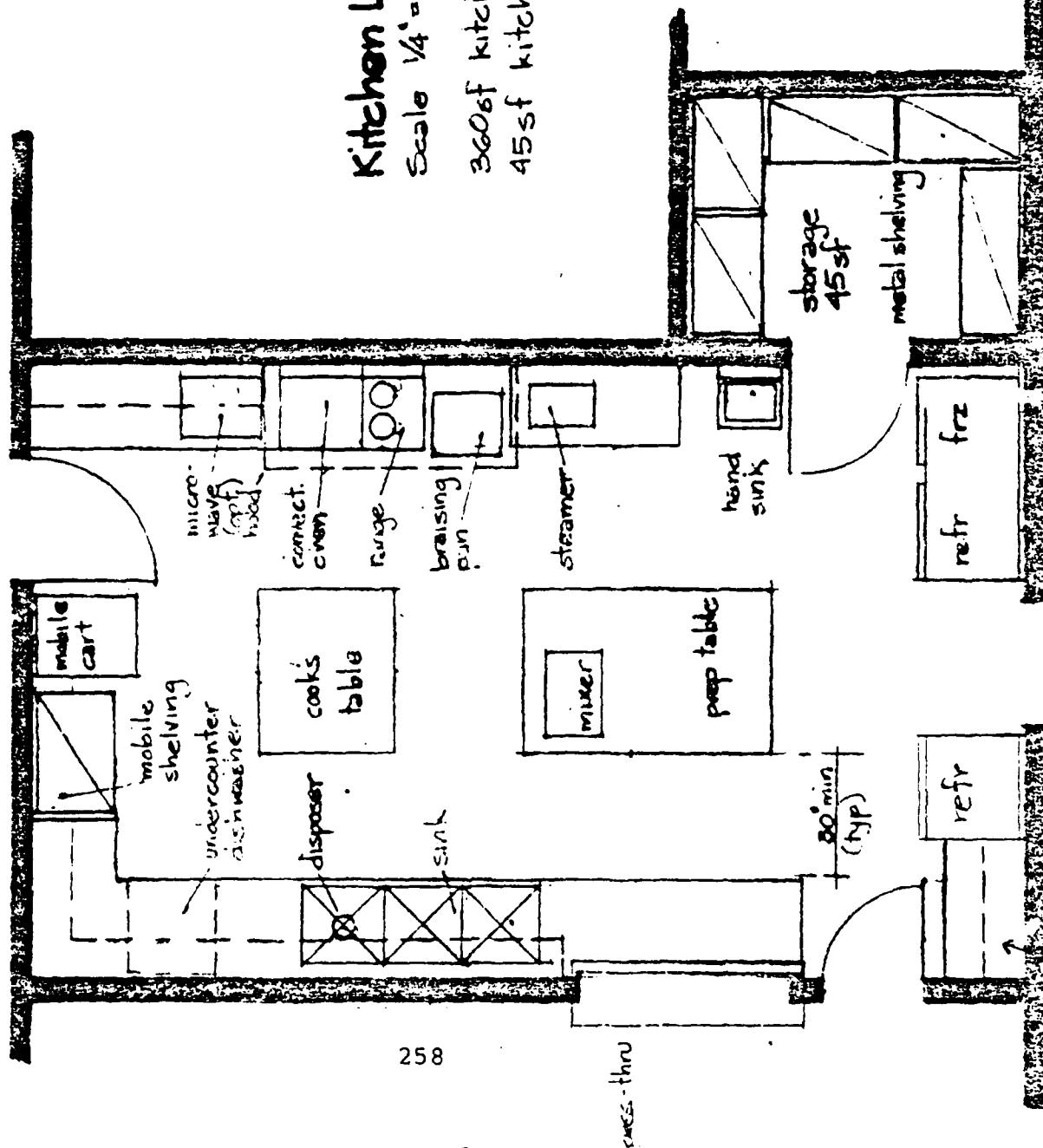
Assigned area	525 sq
Unassigned area	130
Seating area	150
School age storage	60



# Entry sequence (small ctr)

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corridor

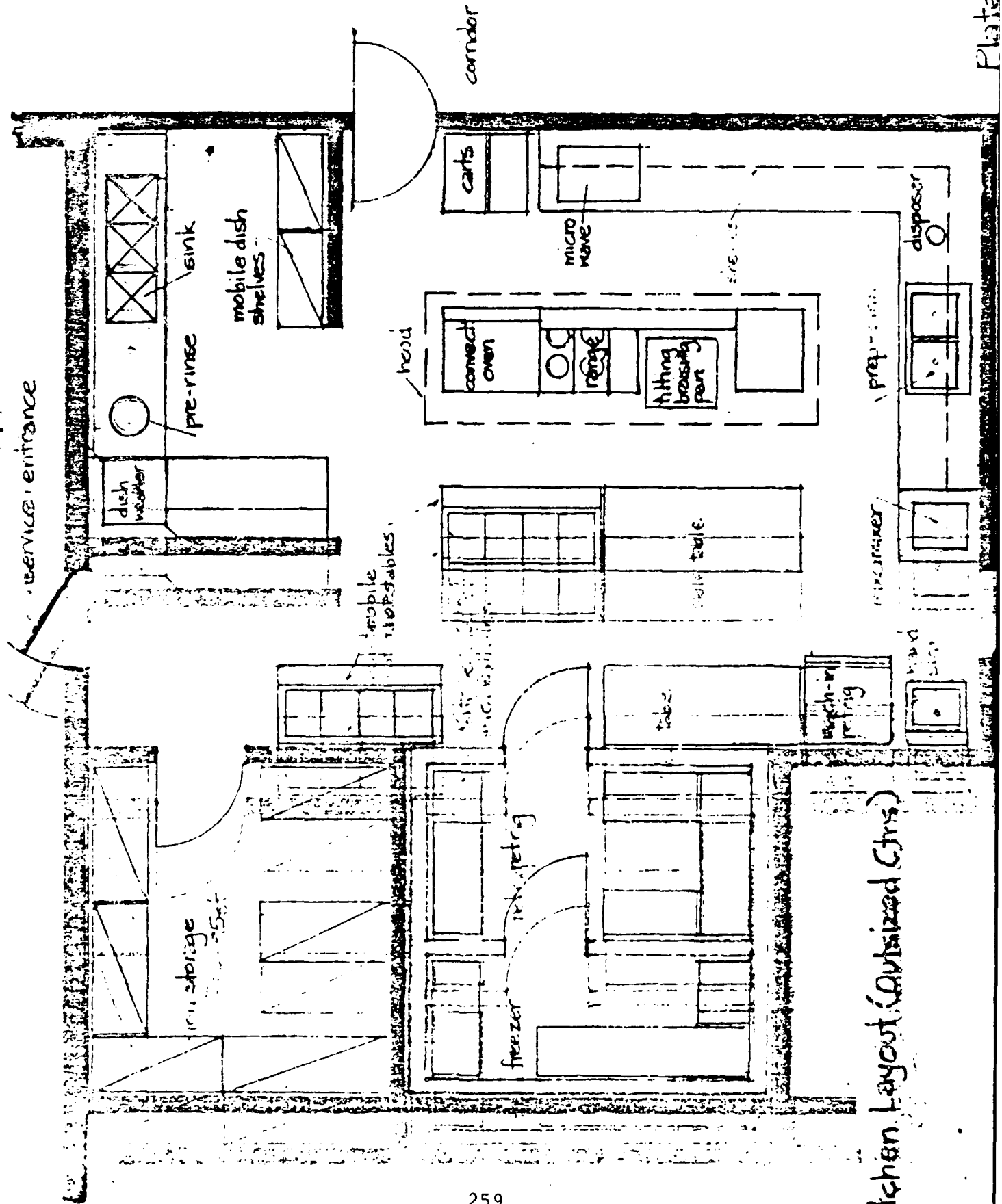


# Kitchen Layout (Small Center)

Scale 1/4" = 1'-0"

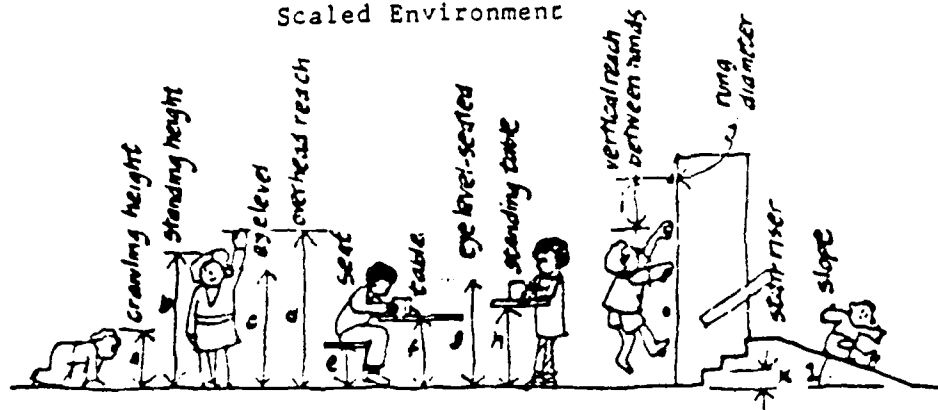
360sf kitchen

45sf kitchen storage



Kitchen Layout (Outboard Ctrs)

# Anthropometric Chart For A Child Scaled Environment



## Children's Dimensions\*

	Age				
	Infants	toddlers	preschool age	school age	
	1	2	4	6	10
Dimensions in inches					
a. Crawling height	13 3/4	16	19 1/2	21 1/2	24 1/2
b. Standing height	29	33 3/4	41	46	54 1/2
c. Eye level	46	50 1/2	56 1/2	61 1/2	68 1/2
d. Overhead reach	58	64 1/2	71 1/2	76 1/2	84 1/2
e. Seat height	10	12 1/2	15	17 1/2	20 1/2
f. Table height (seated)	27 1/2	30 1/2	33 1/2	36 1/2	40 1/2
g. Eye level (seated)	31 1/2	34 1/2	37 1/2	40 1/2	44 1/2
h. Table height (standing)	-	17	20	24	29
i. Vertical reach between hands	-	11 1/2	15 1/2	19 1/2	23 1/2
j. Rung diameter	00	1 1/2	1 1/2	1 3/4	2 1/2
k. Stair riser	1	2	4	5	6
l. Slope	140	140	15	250	350

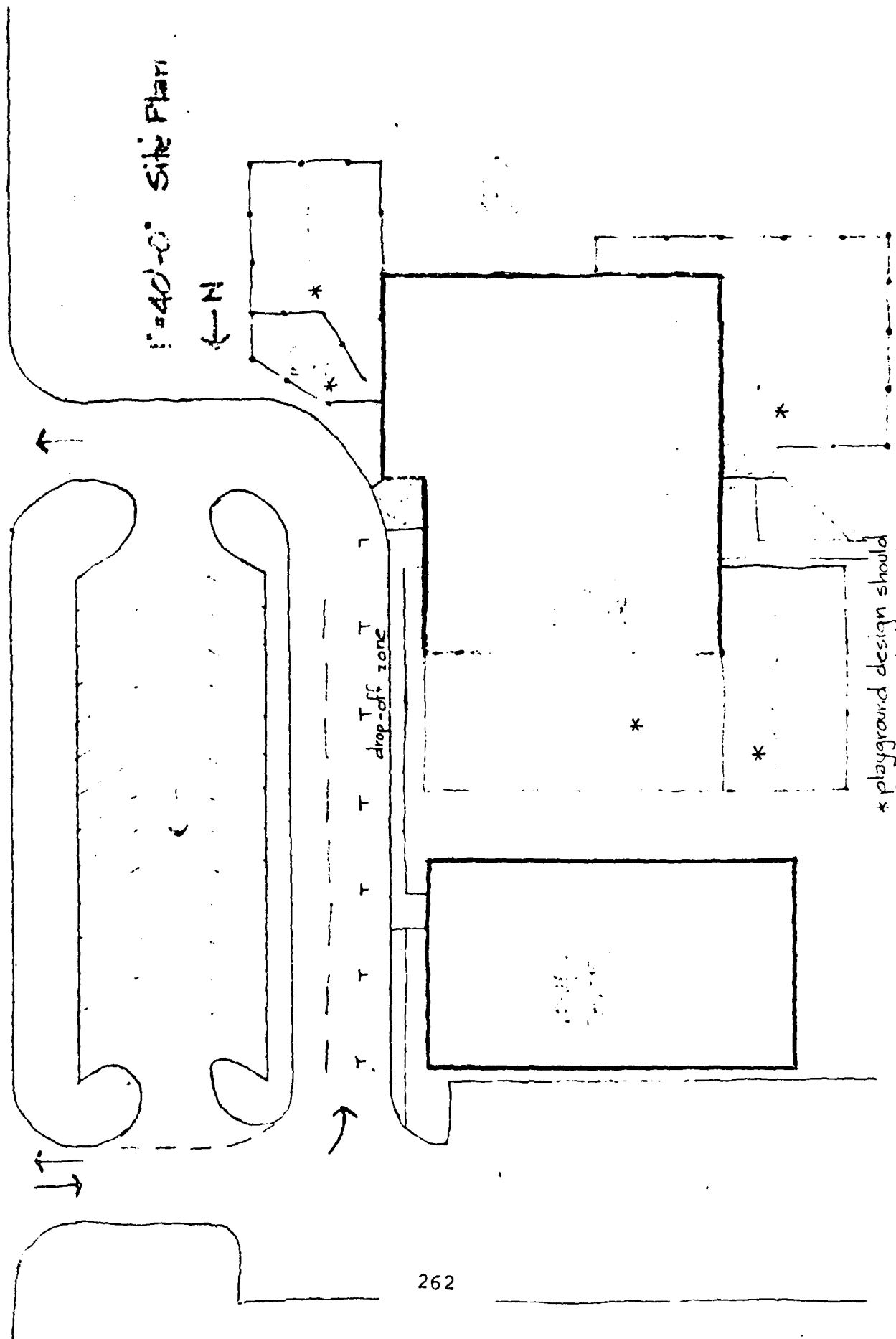
\* Infant feeding chair seat height

\*\* No loose items in infant areas should be less than 1 1/2 inches in diameter.

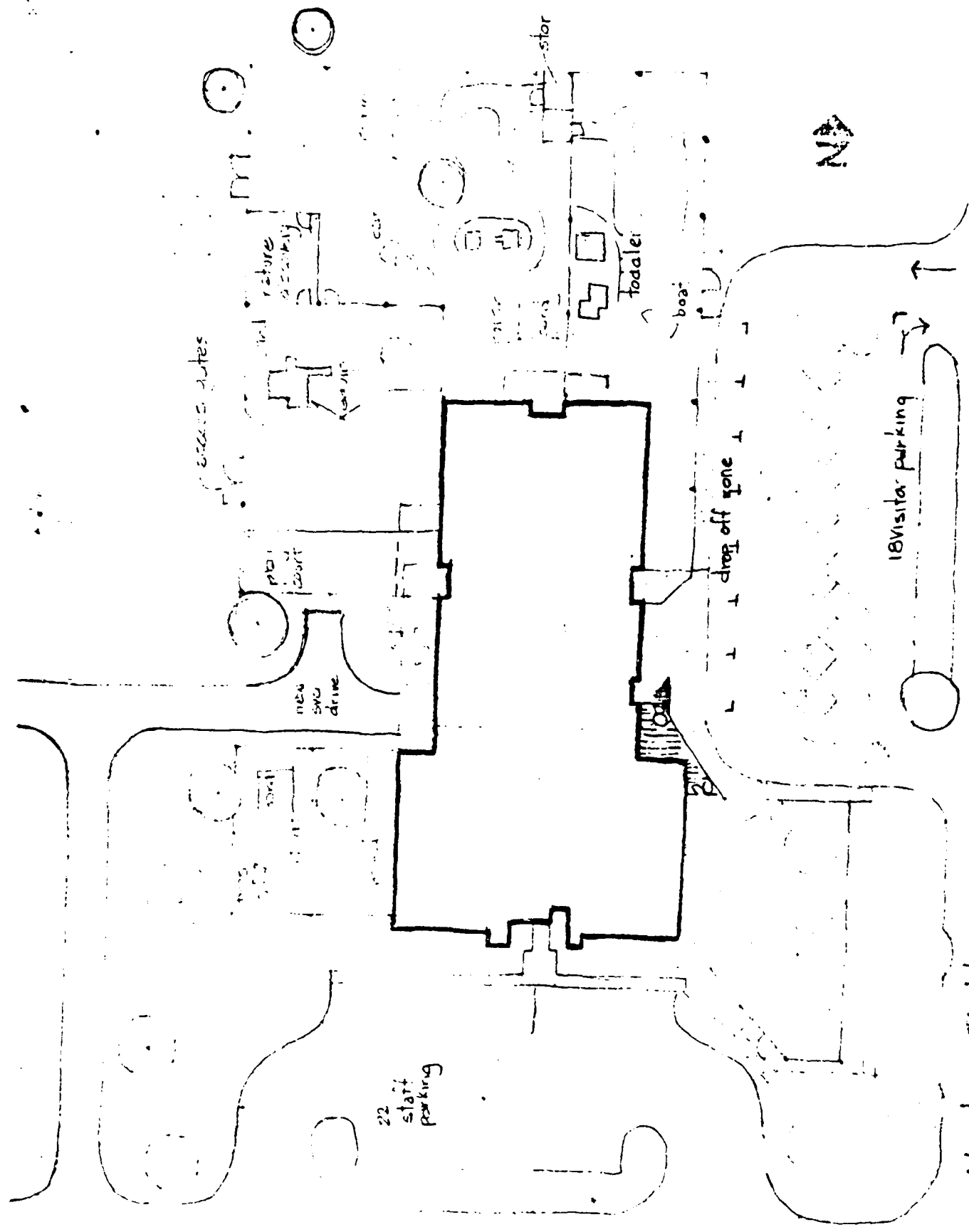
GENERAL ACTIVITIES MATRIX		Area of Equipment																	
0 PARTIAL 2 TOTAL		RINGS/HOOPS	SEE SAW	TIRE SWING	LADDERS	BRIDGES	RAMPS	SPRING PADS	CLIMBING WALLS	WATER	TIRES	55 GAL DRUMS	CLIMBER	SAND	NATURAL LOGS	BALANCE BEAM	NPT	SLIDE	
Attributes																			
PHYSICAL																			
CLIMBING					●		0				●	●	●				●		
SLIDING																		●	
HANGING		●		0		0					0	0	●						
JUMPING							0	●		0	0	0	0	●			0		
SWINGING		0		●							●						0		
CRAWLING					●	0	0		0		●	●		0					
HIDING											0	0							
BALANCING		0	●	●		0		●		0	●	●	0		●	●			
SOCIAL																			
INTERACTION		0	●	●	0	0		●	●	●	0	0	0	0	0	●	●	0	
PARTICIPATION		0	●	●	0	0	0	●	0	●	●	●	0	●	0	0	●	0	
ROLE PLAYING		0	0	0	0	0	0	0	0	●	●	●	0	●		0	●	0	
COOPERATION			●	●		0	0	●	0	●	0	0		●	0			●	
COGNITIVE																			
MANIPULATION		0	0	0					●	0	0			0	●	0			
PROBLEM SOLVING			0		●	0	0		●	●	●	●		●	●	0	0		
CHOOSING		0			0	0	0				0	0	0	0			0		
INTERPRETATION		●		0	0				0	●	●	●		●			●		
GENERAL																			
FLEXIBILITY		0		0	0					●	●	0		●			●		
IMAGINES		0			●	●	●		●	0	0	●	0	0		0	●	0	
RESPONSIVENESS		0	●	●				●	0	●	0			●					

☒ Infant playground  
☒ Toddler playground

☒ Preschool playground  
☒ School-age playground







Norton Child Care ADAL  
 MPSCXC 22 JUL 81  
 1" = 50' - 0"

APPENDIX F  
ROLE OF DEFINITIVE DRAWINGS SURVEY

STATEMENT OF PURPOSE

The following questionnaire is to be used for graduate thesis work in evaluating the role of definitive drawings (AFM 88-2) and in how to best transmit the desired information. Your anonymous contribution and professional judgement is greatly appreciated.

*Christopher D. Basham*

Lt. Christopher D. Basham  
Architect  
Student Air Force Institute of Technology

Please circle the appropriate answer or answers as indicated.

1. What is your area of specialty? (Choose one)
  - A. Civil Engineer
  - B. Mechanical or Electrical Engineer
  - C. Architect or Architectural Engineer
  - D. Other (Please specify) \_\_\_\_\_
  
2. What is your current command, level, and job position or title?  
(Example: AFLC Headquarters Programmer)(Also give office symbol)  
\_\_\_\_\_
  
3. How long have you served in the Air Force Civil Engineering field?
  - A. 0-6 Months
  - B. 6 Months to 1 Year
  - C. 1-2 Years
  - D. 2-5 Years
  - E. 5-10 Years
  - F. Greater Than 10 Years
  
4. Are you acquainted with the definitive drawings, AFM 88-2?
  - A. Yes
  - B. No. (if no you may skip to question 13)
  
5. Please rate the definitive drawings, AFM 88-2, as one of the following.
  - A. Highly useful
  - B. Nice to have around but not used much
  - C. Useless

6. In your current job, how often do you use AFM 88-2, The Definitive Drawings?
- A. Daily
  - B. At least once a week
  - C. At least once a month
  - D. At least once a year
  - E. Not at all
7. How often would you say definitive drawings are used at base level?
- A. Daily
  - B. At least once a week
  - C. At least once a month
  - D. At least once a year
  - E. Not at all
8. What percentage of the buildings you have dealt with are designed exactly conforming to the plans in AFM 88-2, The Definitive Drawings.
- A. 0%
  - B. 1-10%
  - C. 11-50%
  - D. 51-99%
  - E. 100%
9. As you understand them, are definitive drawings to be:
- A. Followed exactly
  - B. Used as a standard with minimum variation allowed
  - C. Used as a guide for design with variation encouraged
  - D. Used as a guide with variation not only encouraged but mandated
10. How would you rate the distribution of use of definitive drawings in the following categories:
- |                        |         |      |
|------------------------|---------|------|
| New construction       | _____ % |      |
| Renovation             | _____ % |      |
| Maintenance and Repair | _____ % | 100% |

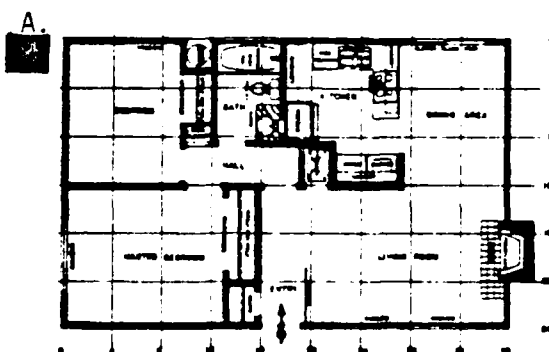
11. Have you ever used a definitive drawing to "sell" a floor plan to anyone?
- A. Yes
  - B. No
12. Have you used a definitive drawing to obtain information for a preliminary cost estimate?
- A. Yes, frequently
  - B. Yes, but seldom
  - C. No
13. In your judgement, without consideration of current regulations or practice, Air Force building types (e.g., Child Care Centers) from one Base to another should be:
- A. Identical
  - B. Contain the same floor plans but vary the outside appearances
  - C. Should be tailored to the site for some but standardized for other types.
  - D. Should be tailored to the site for all types
14. Circle all of the following building types that you feel should have definitive drawings.
- A. Base supply
  - B. Automotive Maintenance Shops
  - C. Security Police Headquarters Bldg
  - D. Ammo Storage Area
  - E. Banking Facilities
  - F. Dining Facilities
  - G. Dormitories
  - H. Fire Stations
  - I. Gymnasiums
  - J. Hangars
  - K. Headquarters Buildings
  - L. Officer Clubs
  - M. NCO Clubs

- N. Operations Buildings
- O. Base Theatres
- P. Warehouses
- Q. Commissaries and BX's
- R. Hospitals
- S. Aircraft Maintenance Shops
- T. Bowling Alleys
- U. Engine Inspection and Repair Shops
- V. All Industrial Types
- W. Squadron Operations
- X. Child Care Centers
- Y. Visitor's Center
- Z. Others (please specify) \_\_\_\_\_

15. Out of 100 projects done at base level how many would you say are new construction?

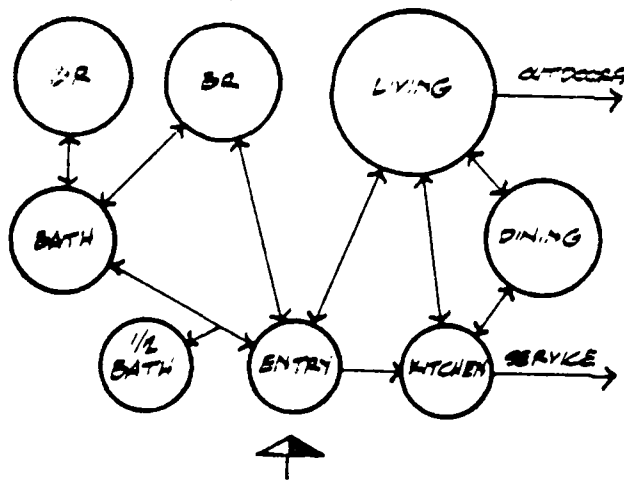
\_\_\_\_\_

The following are three methods which the Air Force has provided or is considering providing design information. (The example is for a residence.)



Floor Plan (Definitive Drawing) - representative of presentation in AFM 88-2. AFM 88-2 also contains brief information on equipment (mechanical, electrical) requirements and approximate square footages of areas.

B.



Bubble diagrams: graphically shows areas and their relationships. May also give minimum square footages allowed plus pertinent mechanical/electrical considerations, etc.

C. Design guide - purely a written statement of objectives. Provides purpose, objectives, and design philosophies as well as mechanical/electrical requirements, etc.

As you answer the following questions assume that Air Force regulations would allow design flexibility in all three methods of presentation (A, B, & C above).

16. Which method of design information would you prefer if you were the designer?

- A. A
- B. B
- C. C
- D. A & B
- E. B & C
- F. A & C
- G. A, B & C
- H. Any of the above (A, B or C)
- I. None are adequate

17. Circle all the levels which should be using the design information.

- A. Base
- B. Command
- C. AF Level



18. What additional information should be provided in a design information package?
19. What, if any, advantages do you see in the standardization of building design?
20. Whichever method for providing design information is adopted, where would they best be placed?
- A. All packages for each bldg. type at all levels
  - B. All packages for each bldg. type at Headquarters only with distribution of individual packages to individual bases on a "as needed" basis.
  - C. All packages for each bldg. type at bases only

APPENDIX G  
SURVEY DATA

AD-A125 381

DEVELOPMENT OF FACILITY TYPE INFORMATION PACKAGES FOR  
DESIGN OF AIR FORCE. (U) AIR FORCE INST OF TECH  
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. C D BASHAM  
MAR 83 AFIT-LSSR-83-82 F/G 5/1

4/4

UNCLASSIFIED

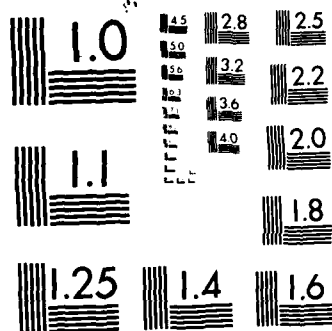
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RESPONDENT	QUESTIONS																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	20			
GROUP A	1	C	B	D	A	B	E	E	B	C	-	B	C	D	2	G	G	A		
	2	B	C	E	B	-	-	-	-	-	-	-	D	10	E	A	A			
	3	A	B	F	A	A	C	C	C	60/100	A	A	D	15	E	G	A			
	4	A	C	F	A	A	C	B	C	75/25	B	A	C	30	F	G	A			
	5	A	C	E	A	B	D	C	A	100/0	B	B	C	25	G	G	B			
	6	C	C	E	A	A	D	D	B	95/5	A	B	D	4	B	D	B			
	7	B	C	F	A	B	E	E	B	100/0	B	B	B	5	E	G	A			
	8	B	C	F	A	B	E	D	A	90/10	B	B	D	2	E	G	A			
	9	C	C	F	A	B	C	D	B	90/10	A	B	C	10	E	G	A			
	10	A	C	D	B	-	-	-	-	-	-	-	D	15	E	A	C			
	11	A	C	E	A	B	D	D	B	-	A	B	C	10	E	D	A			
	12	A	C	E	A	B	E	-	A	B	B	C	C	-	E	G	-			
	13	A	C	F	A	B	C	B	B	30/30	A	A	C	25	A	G	-			
	14	A	C	F	A	A	C	C	C	90/10	A	A	C	2	E	D	B			
	15	D	B	F	A	A	B	B	D	-	B	A	D	20	G	B	A			
	16	A	C	B	A	B	D	D	B	-	B	B	C	40	B	G	A			
	17	B	C	D	A	B	D	D	A	-	B	B	B	5	B	G	A			
	18	A	C	C	A	B	D	C	A	100/0	B	B	C	5	B	G	A			
	19	B	C	E	A	-	C	C	B	100/0	A	B	C	10	G	G	A			
	20	C	C	E	A	B	E	C	B	-	A	B	D	2	E	G	A			
	21	A	B	D	A	B	E	E	A	-	B	B	D	4	B	G	C			
	22	D	C	F	A	B	C	D	B	-	A	B	A	2	F	D	C			
	23	B	C	D	B	-	-	-	-	-	-	-	C	30	E	D	A			
	24	B	C	E	A	B	D	D	A	90/10	B	B	C	5	D	G	A			
	25	D	C	F	A	A	C	B	B	-	A	B	D	15	B	G	A			
	26	A	C	C	B	-	-	-	-	-	-	-	C	25	A	A	B			
	27	D	C	F	B	-	-	-	-	-	-	-	B	10	F	D	A			
	28	D	C	F	A	C	B	C	B	-	A	B	C	2	A	G	A			

GROUP "A" WAS COMPOSED PRIMARILY OF AIR STAFF AND  
 COMMAND LEVEL CIVIL ENGINEERING PERSONNEL  
 ATTENDING A PILOT SHORT COURSE ON COST ESTIMATING  
 OFFERED BY THE SCHOOL OF CIVIL ENGINEERING AT  
 THE AIR FORCE INSTITUTE OF TECHNOLOGY

		QUESTION															
RESPONDENT		1	2	3	4	5	6	8	9	10	11	12	13	15	16		
GROUP "B"	1	B	B	C	A	B	D	B	C	-	B	B	C	10	D		
	2	A	B	D	A	B	D	A	C	100%	B	B	C	3	G		
	3	A	B	B	A	-	-	-	-	-	-	-	C	-	E		
	4	B	C	E	A	B	C	B	D	8/20	A	A	C	20	G		
	5	C	B	B	A	B	C	B	D	7/25	B	C	D	10	E		
	6	B	B	C	A	B	D	A	C	-	B	B	C	12	F		
	7	A	B	A	B	-	-	-	-	-	-	-	C	2	G		
	8	B	B	B	B	-	-	-	-	-	-	-	C	-	G		
	9	B	B	B	B	-	-	-	-	-	-	-	D	10	F		
	10	A	B	B	A	B	E	A	C	-	B	-	D	-	C		
	11	A	B	A	A	B	E	B	C	95/5	B	B	B	1	F		
	12	B	B	C	B	-	-	-	-	-	A	-	B	50	A		
	13	A	B	C	B	-	-	-	-	-	B	-	B	25	F		
	14	A	B	D	A	A	D	C	C	50/50	A	A	C	15	D		
	15	A	B	E	A	B	D	B	B	-	B	C	C	-	B		
	16	B	B	E	A	B	E	B	B	95/5	B	B	C	5	G		
	17	A	B	A	A	B	C	B	C	50/5	B	B	C	5	G		
	18	C	C	E	A	B	E	B	B	-	B	C	D	10	B		
	19	A	B	C	B	-	-	-	-	-	-	-	-	-	B		
	20	A	B	C	A	B	D	B	C	85/15	B	B	D	-	F		
	21	A	C	E	A	B	D	A	C	-	B	B	C	2	G		
	22	D	B	C	A	A	E	C	-	50/50	B	C	C	2	A		
	23	B	B	D	B	-	-	-	-	-	-	-	C	3	F		

GROUP "B" WAS COMPOSED PRIMARILY OF BASE LEVEL CIVIL ENGINEERS.

APPENDIX H  
PROJECT BOOK CHECKLIST

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TAB B—SITE DESCRIPTION	B-1 to B-
TAB C—SPECIAL CONSIDERATIONS	C-1 to C-
TAB D—STRUCTURAL CONSIDERATIONS	D-1 to D-
TAB E—MECHANICAL CONSIDERATIONS	E-1 to E-
TAB F—ELECTRICAL CONSIDERATIONS	F-1 to F-
TAB G—WATER SUPPLY-WASTE TREATMENT	G-1 to G-
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### PART II—PROJECT SUPPORT DATA

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TAB M—ENERGY IMPACT STATEMENT	M-1 to M-
TAB N—MAJCOM REVIEW COMMENTS	N-1 to N-

Figure A7-2. Table of Contents.



TAB A-PROJECT DESCRIPTION SUMMARY  
(General Format)

1. WORK TO BE ACCOMPLISHED:
  - A. SCOPE
  - B. PROJECT DESIGN WILL NOT EXCEED A MAXIMUM CONSTRUCTION COST TARGET (ITEM 12, AF Form 1178) OF \$ \_\_\_\_\_
  - C. WORK DEFINITION—
    - (1) Work to be done—
    - (2) Physical features of the facility—
2. FUNCTIONS OF THE FACILITY AND OCCUPANTS:
3. OCCUPANT AND VISITOR POPULATION:
4. HOURS OF OPERATION:
5. FUTURE EXPANSION:
6. SECURITY REQUIREMENTS:
7. PARKING SUPPORT:
8. BENEFICIAL OCCUPANCY:
9. SPECIAL REQUIREMENTS:
10. DRAWINGS/FLOOR PLANS:
11. OTHER

Prepared By:	Project Description Summary	Preparation Date:
Telephone Ext:	TAB A-I	Proj Book _____
		Revision No. 1 _____
		Revision No. 2 _____
		_____

PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	SEE TAB	NO SPECIAL REMARKS
TAB	B			
SITE DESCRIPTION				
(Includes map/plan locations and narrative of applicable items both existing and suggested. Additional details are expanded to other TABS as cited.)				
1. LOCATION PLAN: (scale - 1:400; 17" x 24")				
a. Facility/Project location.				
b. Site access (roads, bridges (wt), widths, preferred construction traffic routes, extent of traffic at site).				
c. Disposal area (trash, rubble, excavated material; note constraints).				
d. Fire station location, security police headquarters.				
e. Construction material storage areas.				
f. Borrow and spoil areas (type, desirability, distance, routes).				
2. SITE PLAN: (scale - 1:50; 17" x 24")				
a. Grades or contours existing.				
b. Facility location on base; orientation (when mandatory).				
c. Facilities/functions on adjoining areas: (brief description of structures, material, style of structures in the area, intent to implement or ignore existing structure design or style; design impact)				
d. Pavement (type, amount, section, length, width).				
(1) Streets, parking lots, sidewalks (note peak volume).				
(2) Curb, gutters, culverts, pads.				
(3) Runways, taxiways, aprons, overruns, shoulders.				
e. Bridges and fences (describe design criteria when applicable).				
f. Landscaping, turf, groundcover, sprinkler system, (landscape map if available) plantings approved for the installation, erosion control).				
g. Structures and trees existing over 3".				
h. Railroads (routes, sidings, loading ramps, etc.).				
i. Real Estate actions (acquisition, disposal, lease, right-of-way).				
j. Relocation required to clear site (date available).				
k. Demolition required to clear site (date available).				
l. Site restrictions (airfield clearance, explosive storage, etc.).				
TAB B-1				
SITE DESCRIPTION				
PROJECT BOOK (Date)		REVISION 1 (Date)		REVISION 2 (Date)
PREPARED BY				TELEPHONE EXTENSION

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PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	SEE TAB	NO SPECIAL REMARKS
TAB	C			
SPECIAL CONSIDERATIONS				
1. Equipment List and Characteristics				
a. Real Property Installed Equipment				
(1) Government furnished/Government installed.				
(2) Government furnished/contractor installed.				
(3) Contractor furnished/contractor installed.				
b. Function support equipment (mech, elec, structural support requirements.)				
c. Cranes and hoists (loads, controls, locations, uses, speed, etc.)				
2. Unique contractor requirements (e.g., 24-hr/day work capability).				
3. Special applicable construction codes/criteria not mentioned elsewhere herein (NATO, SOFA, base regulations, property protection, use of Government furnished documents, contractor work outside duty hours, disposal of construction debris, facility occupation prior to BOD, etc.)				
4. Skilled labor and/or structural material availability impact.				
5. Utility availability to construction contractor (water, electricity, sanitary sewer, gas, heat, metering, costs, billing, etc.)				
6. Secure area availability for contractor equipment and materials.				
7. Construction season limitations (climatic or economic).				
8. Master Keying requirements; special systems or locks				
9. Trash handling system used on base; availability to contractor.				
10. Clearances required from authorities by contractor				
a. Transportation and security; base entrance.				
b. Equipment and material purchase, installation.				
c. Labor restrictions.				
11. Construction phasing requirements (include utility access and outages).				
12. Factors of risk, restriction, or unusual circumstance expected to increase costs beyond applicable area averages.				
TAB C-1		SPECIAL CONSIDERATIONS		
PROJECT BOOK Date)		REVISION 1 (Date)		REVISION 2 (Date)
PREPARED BY		TELEPHONE EXTENSION		

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PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	SEE TAB	NO SPECIAL REMARKS
TAB	D ARCHITECTURAL AND STRUCTURAL CONSIDERATIONS			
1. General:				
a. Material availability limitations (include fill).				
b. Special design requirements (e.g., special material handling facility).				
c. Vibration producing equipment requiring isolation				
d. Pier, pile, or caisson requirements				
e. Seismic zone/typhoon-hurricane-wind/snow load design criteria (note high loss vs low loss potential)				
f. Conventional/nuclear blast or radiation, and chemical-biological (CB) resistant design criteria.				
g. Architectural style (existing, planned, or desired)				
h. Handicapped design features (Yes No ).				
i. Shielding requirements				
2. Structures:				
a. Unusual floor loads (safes, industrial equipment, etc.).				
b. Span or height requirements				
c. Overhead support requirements (include hoists, cranes, etc.).				
d. Special bay sizes, reflect access dimensions				
e. Fall-out shelter criteria, orientation, capacity.				
f. Mezzanines.				
g. Foundations: predominant base type used/special requirements				
h. Energy conservation requirements.				
(1) Building, orientation, siting configuration				
(2) Insulation (wall, roof, floor)				
(3) Fenestration (Type, exposure, size, etc.).				
(4) Other.				
i. Special Finish Schedule (interior/exterior).				
(1) Protective coating (type, function, undercoating, color, etc.).				
(2) Floor tile, terrazzo, or carpeting (special protection, pattern, or cleaning features desired) special areas required.				
(3) Other specified materials or functions.				
j. Roofing				
(1) Unusual live/dead loading conditions.				
(2) Special material requirements.				
(3) Access requirements.				
TAB D-1 ARCHITECTURAL AND STRUCTURAL CONSIDERATIONS				
PROJECT BOOK Date)		REVISION 1 Date)		REVISION 2 Date)
PREPARED BY			TELEPHONE EXTENSION	

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PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	ISA TAB	NO SPECIAL REQUIREMENTS
TAB D ARCHITECTURAL AND STRUCTURAL CONSIDERATIONS				
k. Doors (other than normal).				
(1) Size (height, width).				
(2) Type (fire rated, sound attenuation, security, etc.).				
(3) Power actuated (floor pedal, button, remote, smoke alarm).				
l. Communications/automatic data processing support.				
(1) Ducting (shielding, bracing/racks, raised flooring, etc.).				
(2) Equipment size to be accommodated.				
m. Sound attenuation requirements (specify area and function):				
specify expected db levels for each standard active band.				
n. Other (e.g., fire walls, flexible partitions, storage requirements, sumps and pits, catch basins, etc.).				
o. Loading docks (dimensions, loads, canopies, overhead tracks, ramps, forklift sizes).				
p. Security features (minimum criteria by function; fencing, windows, doors, hardware, control and detection methods, etc.).				
3. Paving: (Generally limited to predominantly paving projects or unusual requirements beyond the scope of TAB B. Site Description).				
a. Type of paving required; rigid vs flexible (separate by type of work, i.e., new construction, alteration, replacements, repair, etc.).				
b. Design loading (light, medium, heavy, or other; use frequency).				
c. Bridges/culverts and other open drainage factors.				
d. Shoulders and overruns (compact soil, stabilized, turfed, etc.).				
e. Parking - Cite current/proposed area in TAB B plans).				
(1) Criteria/required parking capacity.				
(2) Markings and signs (e.g., handicapped, taxiways, centerlines).				
f. Street layout (special width, intersection, drainage, etc.).				
g. Storm drainage (type and current capacity, cite on TAB site plan).				
h. POL dikes.				
TAB D-2 ARCHITECTURAL AND STRUCTURAL CONSIDERATIONS				
PROJECT BOOK (Date)		REVISION 1 (Date)		REVISION 2 (Date)
PREPARED BY		TELEPHONE EXTENSION		

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PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	SEE TAB	NO SPECIAL REMARKS
TAB	E			
MECHANICAL CONSIDERATIONS				
1. GENERAL				
a. Special mechanical system required				
b. Maintenance considerations				
c. Cleanroom, paint spray booth, and chemical tank, etc., criteria				
d. Compressed air generation and distribution (outlets, cfm@ psi, show location on TAB A single line drawing)				
e. Utility system drawing (location, size, materials, points of function); attach only as required to expand detail of TAB B plan).				
f. Special peak periods of use (define) heat, ACND, etc.				
g. Corrosion Control/Cathodic Protection.				
h. Energy Conservation Measures.				
i. Energy Monitoring Control System (EMCS)				
(1) Existing System (type, size, location, etc.).				
(2) Plans for future EMCS.				
2. PLUMBING. (See TAB G for water supply and waste treatment system considerations).				
a. Building Water Supply				
(1) Source of Supply.				
(2) Piping and special outlets.				
(3) Booster System.				
(4) Hot Water (industrial or domestic).				
b. Drinking Fountains.				
c. Sanitary Drainage System.				
d. Garbage Disposal.				
e. Grease Interception.				
f. Chemical waste drainage and disposal.				
g. Radioactive waste.				
h. Piping System (General).				
(1) Hospital and surgical gases.				
(2) Compressed Air.				
(3) Distilled Water.				
(4) Venting.				
(5) Natural or LP gas.				
(6) Insulation.				
(7) Materials (galvanized, DMV, VC, copper, welded, CI, etc.).				
3. STORM DRAINAGE SYSTEM				
TAB E-1 MECHANICAL CONSIDERATIONS				
PROJECT BOOK (Date)		REVISION 1 (Date)		REVISION 2 (Date)
PREPARED BY		TELEPHONE EXTENSION		

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PROJECT BOOK CHECKLIST		STATEMENT ATTACHED	SEE TAB	NO SPECIAL REQUIREMENTS
TAB I FIRE PROTECTION CONSIDERATIONS				
1. GENERAL DESIGN GUIDANCE CHECKLIST:				
a. Type occupancy (light, ordinary, hazardous, mixed).				
b. Water supply characteristics (existing or planned extension).				
(1) Capacity (available flow) hydrant specifications.				
(2) Type pump activation.				
(3) Fire water storage tank(s) and pump.				
(4) Same as or separate from potable water supply.				
c. Response distance/time (mobile fire apparatus).				
d. Fire detection and alarm systems (existing/planned).				
(1) Alarm annunciators.				
(2) Type detectors.				
e. Type suppression system existing (wet, dry, deluge, other).				
2. PLANS FOR FUTURE EXTENSIONS UNRELATED TO THIS PROJECT				
3. SPECIAL FIRE SUPPRESSION SYSTEM REQUIREMENTS				
(The design agent/A-E firm will insure the following additional items are addressed in the design and will comply with below cited references.)				
a. Means of egress (NFPA 101).				
b. Fire area limitations (NBC).				
c. Fire walls, partitions, draft curtains.				
d. Emergency lighting.				
e. Detection system -				
(1) Type (manual, automatic, or both).				
(2) Detectors (type and spacing).				
(3) System supervision (e.g., electrical).				
(4) Transmitters/annunciators.				
(5) Redundancy and backup provisions.				
f. Suppression system -				
(1) Type (agent, activation, NFPA II through 18).				
(2) Discharge coverage (area, location, volume).				
(3) Design density or concentration.				
(4) Compatibility with existing system.				
(5) System supervision (values and controls).				
(6) Redundancy or backup provisions.				
TAB I-1 FIRE PROTECTION CONSIDERATIONS				
PROJECT BOOK Date		REVISION 1 Date		REVISION 2 Date
PREPARED BY		TELEPHONE EXTENSION		

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